

Supporting Information

Late-stage Peptide Modification and Cyclization via Maleimidation of C(7)-H Tryptophan

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1. General Information

All the reagents are obtained from commercial sources without further purification unless indicated. The water used in the laboratory comes from the Milli-Q reference system. Thin-layer chromatography (TLC) and silica gel for column chromatography comes from Qingdao Marine chemical plant (200-300 mesh). The peptide substrates and stapled peptide precursors were synthesized by traditional methods including liquid phase synthesis of peptides and solid synthesis of peptides. The spectra of absorption and fluorescence were analyzed using Molecular Devices SpectraMax M5. ^1H NMR spectra were obtained on AVANCE III 500 (500 MHz), WNMR-I 400MHz and AVANCE III HD 600 instrument (600 MHz). ^{13}C NMR spectra were obtained on AVANCE III 500 (126 MHz), WNMR-I 400MHz (101 MHz) and AVANCE III HD 600 instrument (151 MHz). ^1H NMR spectrum multiplicities as following: s (singlet), br (broad), d (doublet), t (triplet), q (quadruplet), m (multiplet). Cell imaging was performed using Leica TCS SP8. Reactions were detected by thin layer chromatography (TLC) under 254 nm or 365 nm with portable UV lamp and 2% ninhydrin stains in ethanol. High resolution mass spectrum (HRMS) with Agilent 6530 QTOF mass spectrometer.

2. Structure of C7-modification/cyclization Tryptophan-peptides

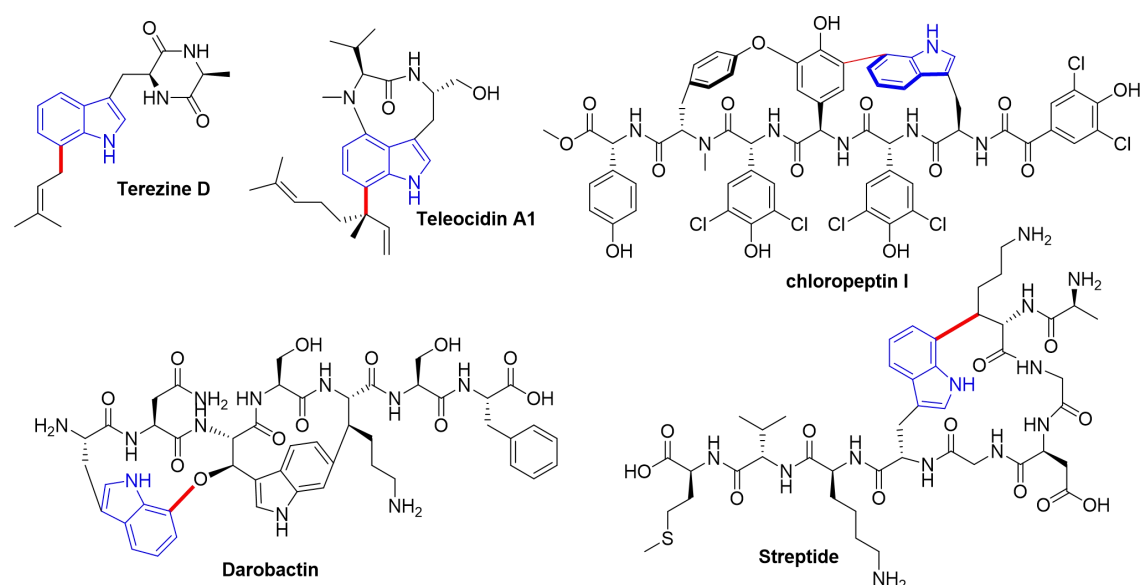
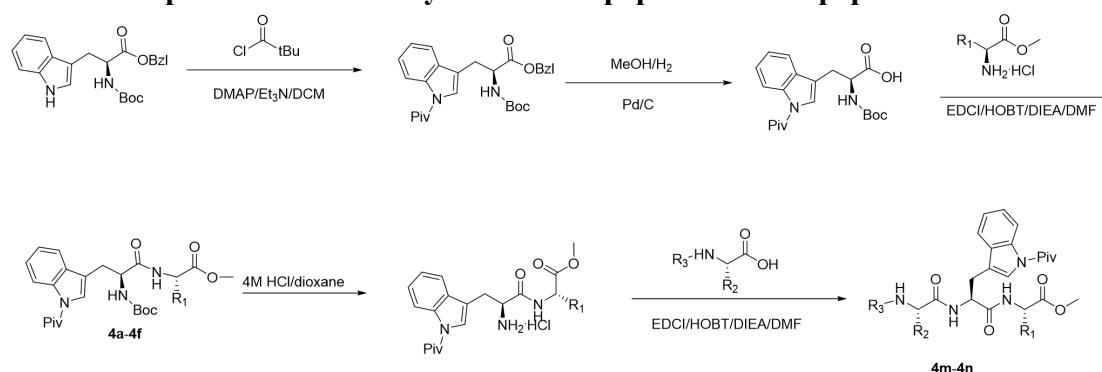


Figure S1. Bioactive C7-modification/cyclization Tryptophan-peptide Derivatives and Natural Products

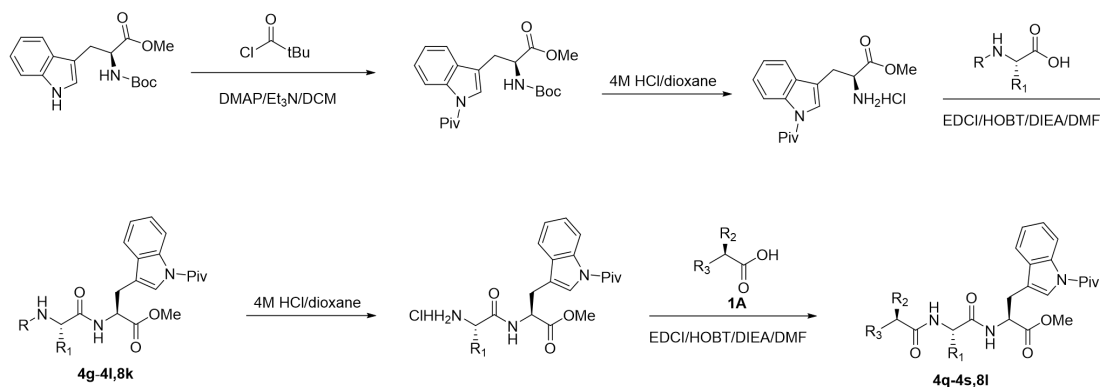
3. Experimental Section

A. General procedure for the synthesis of dipeptides and tripeptides



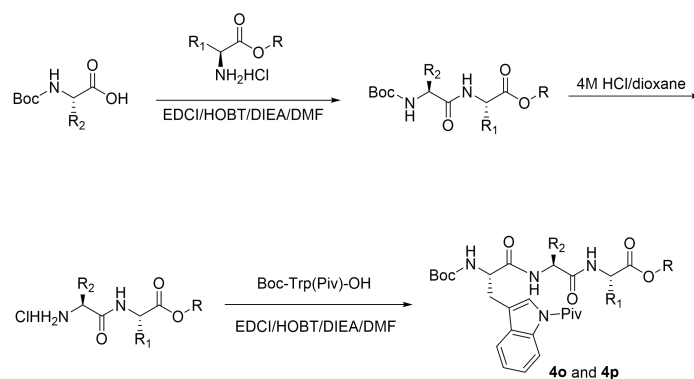
Scheme S1a. Preparation of dipeptides and tripeptides through solution-phase peptide synthesis.

Pivaloyl chloride (15.0 mmol) was added in portions at 0°C to a stirred solution of Boc-Trp-OBzl (3940mg, 10.0 mmol), DMAP (0.1 eq), Et₃N (20.0 mmol) in dry DCM (50 mL). The reaction was then allowed to warm to room temperature and stirred overnight. The mixed solution was washed with 1M dilute hydrochloric acid and saturated brine, and then dried with anhydrous sodium sulfate. After removal of the solvent, residue was purified on silica gel column chromatography to afford the corresponding acylation product Boc-Trp(Piv)-OBzl. Dissolve Boc-Trp(Piv)-OBzl (4.3 g, 9 mmol) in 50 mL methanol, then add 10% palladium/carbon (210 mg) in a nitrogen atmosphere, replace with hydrogen 3 times, and then stir at room temperature 12 hours. After completion, the reaction mixture was filtered and the filter cake was washed 3 times with methanol. The organic layers were combined and concentrated in vacuo, and residue was purified on silica gel column chromatography to afford the corresponding product Boc-Trp(Piv)-OH. Boc-Trp(Piv)-OH (388 mg, 1 mmol), EDCI (290 mg, 1.5 mmol), HOBT (202 mg, 1.5 mmol) and H-AA₁-OMe·HCl (1 mmol) were dissolved in 10mL DMF, then DIEA (390 mg, 3 mmol) was added, stirred in room temperature overnight. Upon completion, 30 mL EtOAc and 30 mL H₂O were added, the organic layer was separated and washed with 30 mL 1M HCl, 30 mL saturated sodium bicarbonate, 30 mL saturated sodium chloride and dried with anhydrous sodium sulfate, filtered, concentrated in vacuum to get dipeptides Boc-Trp(Piv)-AA₁-OMe. Next, the Boc-Trp(Piv)-AA₁-OMe (1 mmol) was dissolved in 10 mL 4M HCl/dioxane for 30 min, then concentrated in vacuum, diluting with ice ether, a lot of solid form, dried in vacuum to get H-Trp(Piv)-AA₁-OMe·HCl for the next step. R₃-AA₂-OH (1 mmol), EDCI (290 mg, 1.5 mmol), HOBT (202 mg, 1.5 mmol) and H-Trp(Piv)-AA₁-OMe·HCl (1 mmol) were dissolved in 10 mL DMF, then DIEA (390 mg, 3 mmol) was added, stirred in room temperature overnight. Upon completion, 30 mL EtOAc and 30 mL H₂O were added, the organic layer was separated and washed with 30 mL 1M HCl, 30 mL saturated sodium bicarbonate, 30 mL saturated sodium chloride and dried with anhydrous sodium sulfate, filtered, concentrated in vacuum to get tripeptides R₃-AA₂-Trp(Piv)-AA₁-OMe without further purified for the next step.



Scheme S1b. Preparation of dipeptides and tripeptides through solution-phase peptide synthesis.

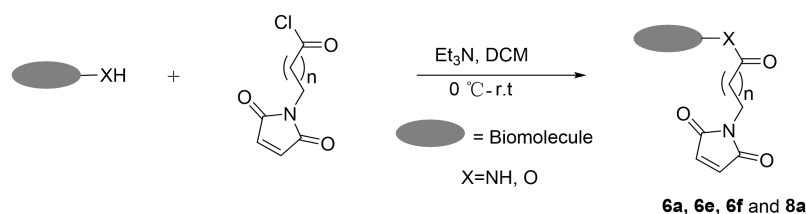
Pivaloyl chloride (15.0 mmol) was added in portions at 0°C to a stirred solution of Boc-Trp-OMe (3180mg, 10.0 mmol), DMAP (0.1 eq), Et₃N (20.0 mmol) in dry DCM (50 mL). The reaction was then allowed to warm to room temperature and stirred overnight. The mixed solution was washed with 1M HCl and saturated brine, and then dried with anhydrous sodium sulfate. After removal of the solvent, residue was purified on silica gel column chromatography to afford the corresponding acylation product Boc-Trp(Piv)-OMe. Next, the Boc-Trp(Piv)-OMe (9 mmol) was dissolved in 90 mL 4M HCl/dioxane for 30 min, then concentrated in vacuum, diluting with ice ether, a lot of solid form, dried in vacuum to get H-Trp(Piv)-OMe·HCl for the next step. H-Trp(Piv)-OMe·HCl (338 mg, 1 mmol), R-AA₁-OH (1 mmol), EDCI (290 mg, 1.5 mmol) and HOBT (202 mg, 1.5 mmol) were dissolved in 10 mL DMF, then DIEA (390 mg, 3 mmol) was added, stirred in room temperature overnight. Upon completion, 30 mL EtOAc and 30 mL H₂O were added, the organic layer was separated and washed with 30 mL 1M HCl, 30 mL saturated sodium bicarbonate, 30 mL saturated sodium chloride and dried with anhydrous sodium sulfate, filtered, concentrated in vacuum to get dipeptides R-AA₁-Trp(Piv)-OMe without further purified for the next step. The Boc-AA₁-Trp(Piv)-OMe (1 mmol) was dissolved in 10 mL 4M HCl/dioxane for 30 min, then concentrated in vacuum, diluting with ice ether, a lot of solid form, dried in vacuum to get H-AA₁-Trp(Piv)-OMe·HCl for the next step. **1A** (1 mmol), EDCI (290 mg, 1.5 mmol), HOBT (202 mg, 1.5 mmol) and H-AA₁-Trp(Piv)-OMe·HCl (1 mmol) were dissolved in 10 mL DMF, then DIEA (390 mg, 3 mmol) was added, stirred in room temperature overnight. Upon completion, 30 mL EtOAc and 30 mL H₂O were added, the organic layer was separated and washed with 30 mL 1M HCl, 30 mL saturated sodium bicarbonate, 30 mL saturated sodium chloride and dried with anhydrous sodium sulfate, filtered, concentrated in vacuum to get tripeptides **4q-4s** or **8l** without further purified for the next step.



Scheme S1c. Preparation of tripeptides through solution-phase peptide synthesis.

Boc-AA₂-OH (1 mmol), EDCI (290 mg, 1.5 mmol), HOBT (202 mg, 1.5 mmol) and H-AA₁-OMe.HCl (1 mmol) were dissolved in 10 mL DMF, then DIEA (390 mg, 3 mmol) was added, stirred in room temperature overnight. Upon completion, 30 mL EtOAc and 30 mL H₂O were added, the organic layer was separated and washed with 30 mL 1M HCl, 30 mL saturated sodium bicarbonate, 30 mL saturated sodium chloride and dried with anhydrous sodium sulfate, filtered, concentrated in vacuum to get dipeptides Boc-AA₂-AA₁-OMe. Next, the Boc-AA₂-AA₁-OMe (1 mmol) was dissolved in 10 mL 4M HCl/dioxane for 30 min, then concentrated in vacuum, diluting with ice ether, a lot of solid form, dried in vacuum to get H-AA₂-AA₁-OMe.HCl for the next step. Boc-Trp(Piv)-OH (388 mg, 1 mmol), EDCI (290 mg, 1.5 mmol), HOBT (202 mg, 1.5 mmol) and H-AA₂-AA₁-OMe.HCl (1 mmol) were dissolved in 10 mL DMF, then DIEA (390 mg, 3 mmol) was added, stirred in room temperature overnight. Upon completion, 30 mL EtOAc and 30 mL H₂O were added, the organic layer was separated and washed with 30 mL 1M HCl, 30 mL saturated sodium bicarbonate, 30 mL saturated sodium chloride and dried with anhydrous sodium sulfate, filtered, concentrated in vacuum to get tripeptides Boc-Trp(Piv)-AA₂-AA₁-OMe without further purified for the next step.

B. General procedure for the substrates which modification with maleimides of N-substituted alkanoyl chlorides

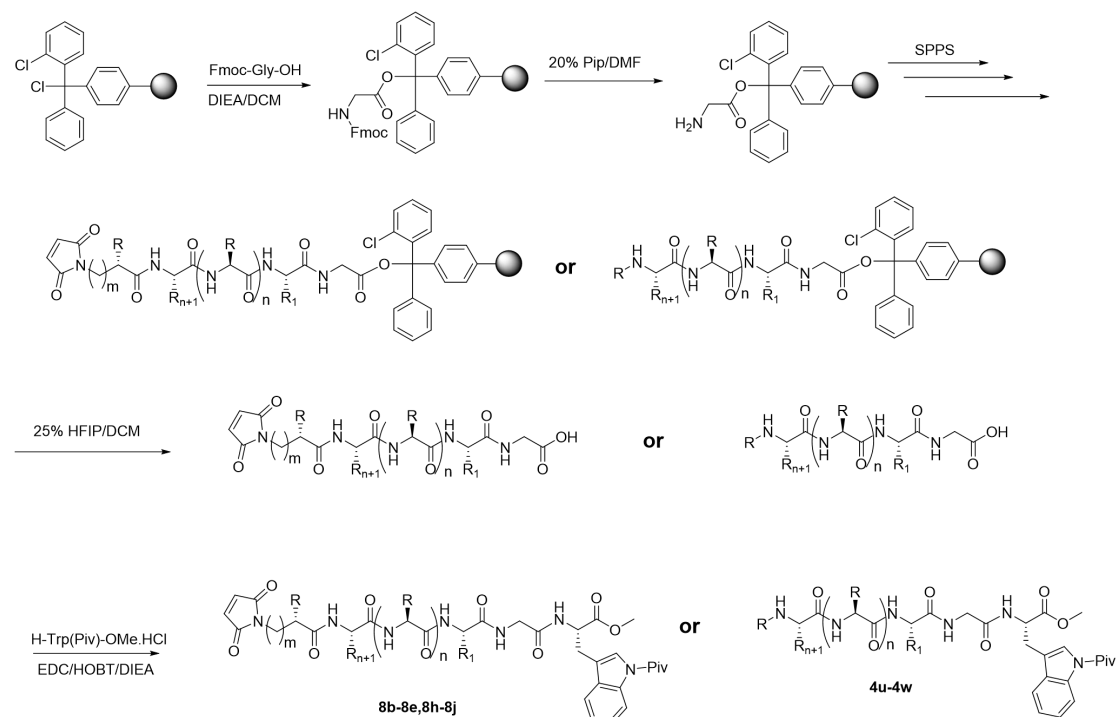


Scheme S2. Preparation of 3-maleimidopropionyl modification substrates.

Typically, the biomolecule compound (1 mmol) were dissolved in 10 mL DCM, Et₃N (150 mg, 1.5 mmol) was added, then cooled to 0 °C. 3-Maleimidopropionyl chloride/11-maleimidooundecanoyl chloride (1.2 mmol) dissolved in 5 mL DCM was dropwised to the reaction mixture, then warmed to room temperature overnight. The reaction mixture was diluted with 10 mL EtOAc and 10 mL H₂O. The organic layer was washed with 10 mL 1M HCl, 10 mL saturated sodium bicarbonate, 10 mL saturated

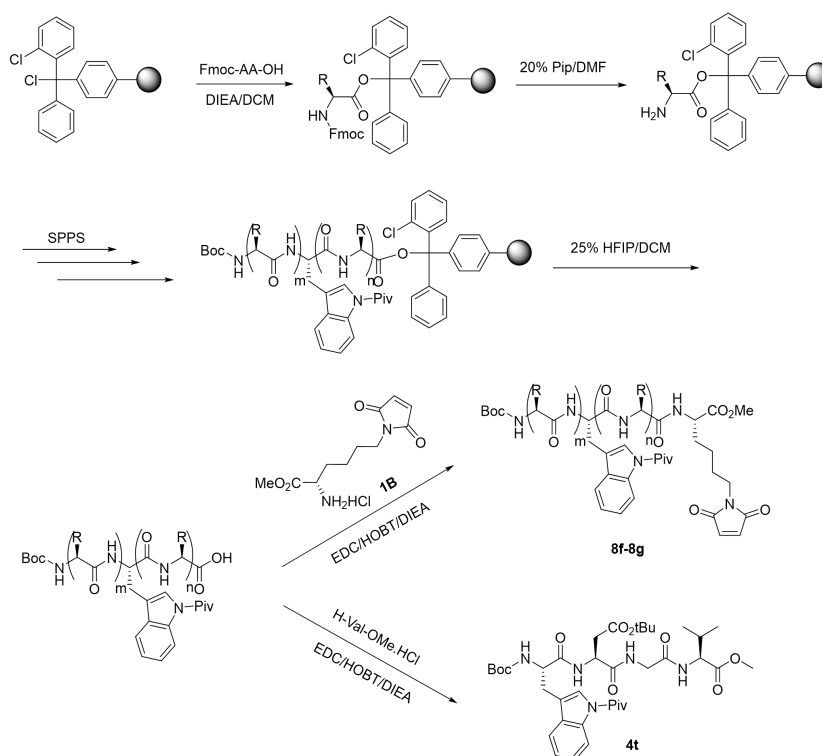
sodium chloride and dried with anhydrous sodium sulfate, filtered, concentrated in vacuum to get the crude product further purified by flash column to get desired products.

C. General procedure of tetrapeptides, pentapeptides and hexapeptide



Scheme S3a. Procedure for tetrapeptides, pentapeptides and hexapeptide

The CTC Resin (300 mg, 0.3 mmol) was suspended in 5mL DCM, then Fmoc-Gly-OH (267 mg, 0.9 mmol) and DIEA (154.8 mg, 1.2 mmol) were added, reacted in the shaker, after 2 h, 300 μ L MeOH was added for 10 min, then the Fmoc-Gly-CTC Resin was washed with DMF for three times. Fmoc-Gly-CTC Resin deprotects the Fmoc with 20% piperidine/DMF for 30 min. After reaction, the H-Gly-CTC Resin was washed with DMF for four times. Subsequent amino acids were coupled using standard solid phase peptide synthesis (SPPS) until all the amino acid was incorporated. The peptides were removed from CTC Resin using 25% HFIP/DCM for 1 h, filtered, washed DCM for three times, combined the filtrate and concentrated in vacuum to get peptide. Finally, the linear peptide (0.2 mmol), H-Trp(Piv)-OMe·HCl (67.7 mg, 0.2 mmol), EDCI (58 mg, 0.3 mmol) and HOBT (40 mg, 0.3 mmol) were dissolved in 3 mL DMF, then DIEA (78 mg, 0.6 mmol) was added and stirred in room temperature for 12 h. Upon completion, 20 mL EtOAc and 20 mL H₂O were added, the organic layer was separated and washed with 20 mL 1M HCl, 20 mL saturated sodium bicarbonate, 20 mL saturated sodium chloride and dried with anhydrous sodium sulfate, filtered, concentrated in vacuum to get the linear peptide without purified for the next step.



Scheme S3b. Procedure for tetrapeptides, pentapeptides and hexapeptide

The CTC Resin (300 mg, 0.3 mmol) was suspended in 5 mL DCM, then Fmoc-AA-OH (0.9 mmol) and DIEA (154.8 mg, 1.2 mmol) were added and stirred for 2 h. 300 μ L MeOH was added, and after 10 min, the Fmoc-AA-CTC Resin was washed with DMF for three times. The Fmoc was deprotected with 20% piperidine/DMF for 30 min. After reaction, the H-AA-CTC Resin was washed with DMF for four times. Subsequent amino acids were coupled using standard solid-phase peptide synthesis (SPPS). The peptides were removed from CTC Resin using 25% HFIP/DCM for 1 h, filtered, and the resins were washed with DCM for three times, combined the filtrate and concentrated in vacuum to get peptides. Finally, the linear peptides (0.2 mmol), **1B**/H-Val-OMe·HCl (0.2 mmol), EDCI (60 mg, 0.3 mmol) and HOBT (40 mg, 0.3 mmol) were dissolved in 3 mL DMF, then DIEA (78 mg, 0.6 mmol) was added, stirred at room temperature for 12 h. Upon completion, 30 mL EtOAc and 30 mL H₂O were added, the organic layer was separated and washed with 30 mL 1M HCl, 30 mL saturated sodium bicarbonate, 30 mL saturated sodium chloride and dried with anhydrous sodium sulfate, filtered, concentrated in vacuum to get the linear peptides without purified for the next step.

D. General procedure for Rh-catalyzed Maleimidylolation of Trp containing amino acids, dipeptides, tripeptides, tetrapeptides and pentapeptides

Typically, the Trp containing amino acid and peptide substrate (0.2 mmol), [RhCp*Cl₂]₂ (6.2 mg, 0.01 mmol) were suspended in 1.5–2 mL DCM, then maleimide/N-substituted maleimide derivatives (0.6 mmol), AgNTf₂ (15.5 mg, 0.04 mmol) and Ag₂O (69.5 mg, 0.3 mmol) were added. The tube was sealed and the mixture was heated to 80 °C for 6–12 h. After cooling to ambient temperature, diluted with DCM and passed through a short celite pad, the solvent was evaporated in vacuum to get the crude product further purified by flash column or PTLC.

E. General procedure of Rh-catalyzed cyclization of peptides

Typically, the linear peptide containing Trp (0.12 mmol), [RhCp*Cl₂]₂ (7.4 mg, 0.012 mmol) were suspended in 10 mL DCM, then AgNTf₂ (18.6 mg, 0.048 mmol) and Ag₂O (41.7 mg, 0.18 mmol) were added. The tube was sealed and the mixture was heated to 80 °C for 24 h. After cooling to ambient temperature, diluted with DCM and passed through a short celite pad. The solvent was evaporated in vacuum to get the crude product further purified by flash column or PTLC.

F. Studies on potential racemization

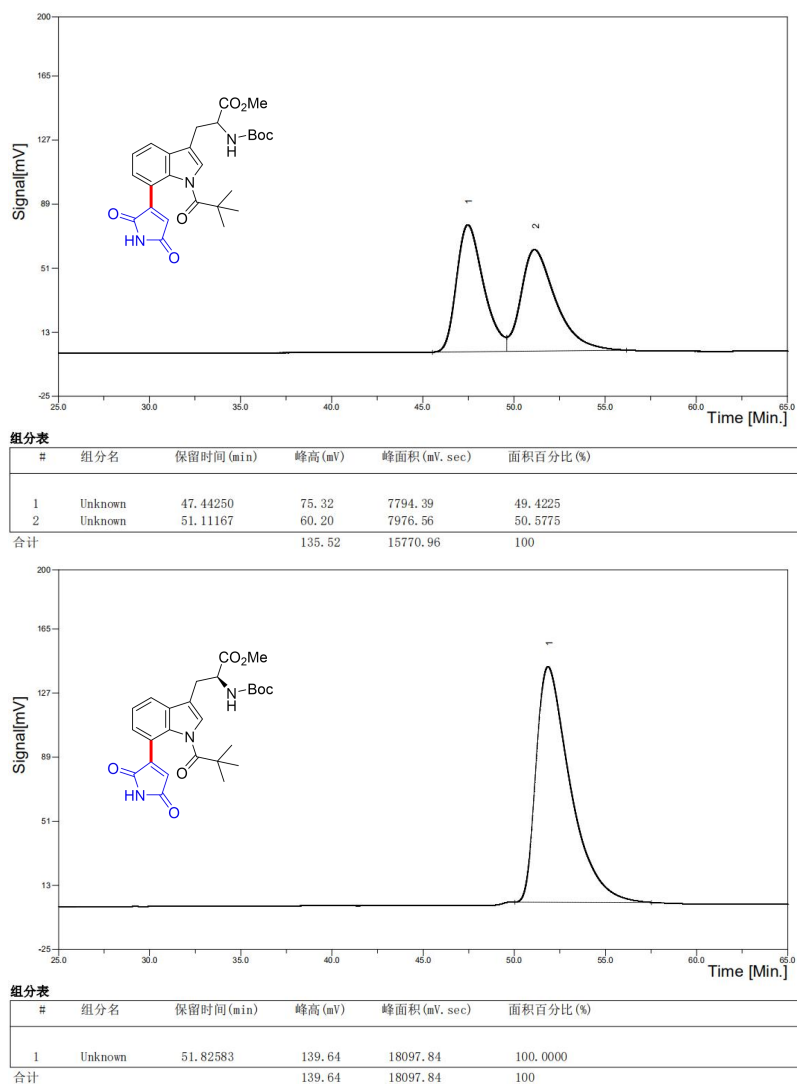
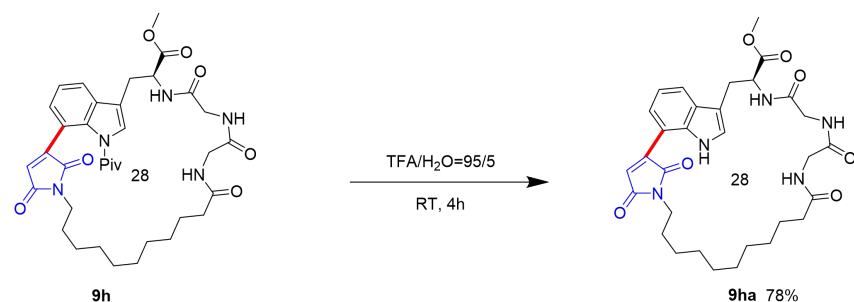


Figure S2. HPLC spectra of racemate and **3a**. Chromatographic column: Daicel Chiralpak AD-H 5 μ m, solvent: *n*-hexane/*i*PrOH, wavelength: 254.

G. Removal of the directing group



Scheme S4. Removal of the directing group

Cyclic peptide **9h** (67.7mg, 0.1 mmol) was removed the directing group using a cock tail of 2 mL TFA/H₂O=95/5 at room temperature for 4 h. Upon completion, saturated sodium bicarbonate was added, extracted with ethyl acetate, dried over anhydrous sodium sulfate, concentrated in vacuo, and further purified by flash column to afford 46 mg **9ha** as a yellow solid in 78% yield.

H. Reaction of maleimide-modified substrate **3a** with Boc-Cys-OMe

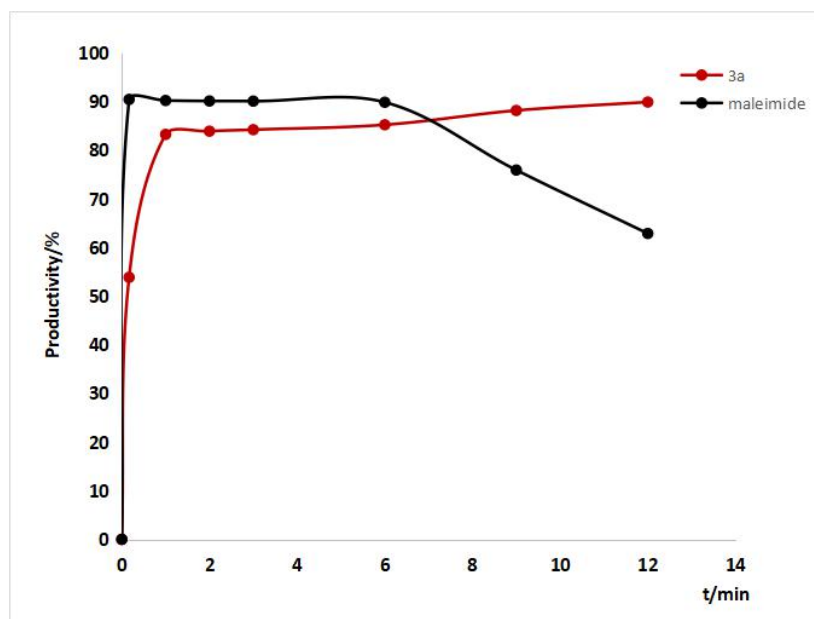
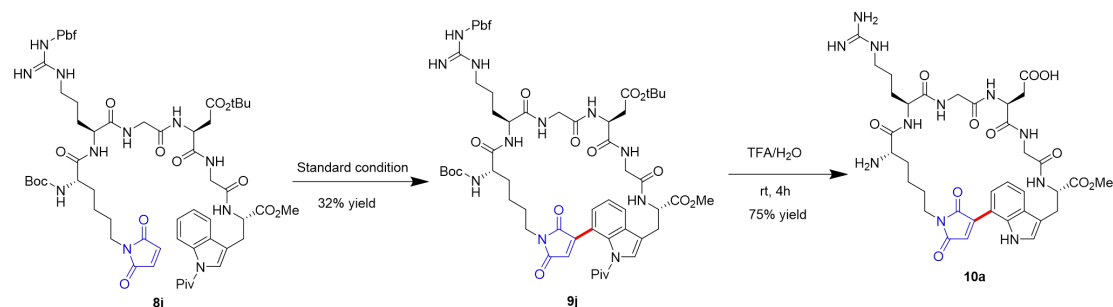


Figure S3. Maleimide-modified substrate **3a** (red curve)/maleimide (black curve) reaction with Boc-Cys-OMe: In alkaline solution, maleimide-modified substrate **3a**/maleimide was reacted with Boc-Cys-OMe for 0-12 min.

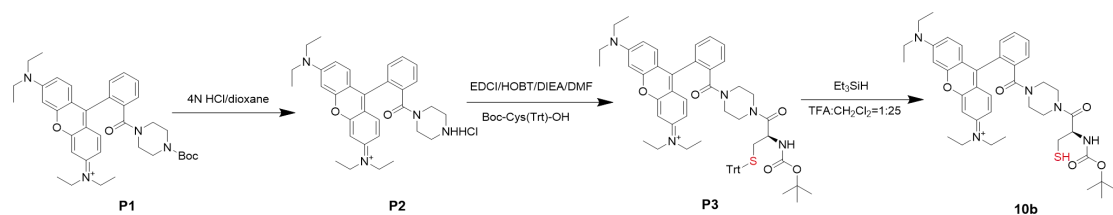
I. Synthesis of cyclic peptide 10a



Scheme S5. Procedure for cyclic peptide **10a**

Linear peptide **8j** (156 mg, 0.12 mmol), [RhCp*Cl₂]₂ (7.4 mg, 0.012 mmol) were suspended in 10 mL DCM, then AgNTf₂ (18.6 mg, 0.048 mmol) and Ag₂O (41.7 mg, 0.18 mmol) were added. The tube was sealed and the mixture was heated to 80 °C for 24 h. After cooling to ambient temperature, diluted with DCM and passed through a short celite pad. The solvent was evaporated in vacuum to get the crude product further purified by flash column (diluting with DCM/MeOH = 50:1-20:1) to afford cyclic peptide **9j** 50 mg yellow solid in 32% yield. Cyclic peptide **9j** (26 mg, 0.02 mmol) was then deprotected using a cock tail of 0.4 mL TFA/H₂O=95/5 at room temperature for 4 h. After diluted with ice ether, the solid formed was further purified by RP-HPLC to afford 12 mg **10a** as a yellow solid in 75% yield.

J. Synthesis of probe 10b



Scheme S6. Procedure for probe **10b**

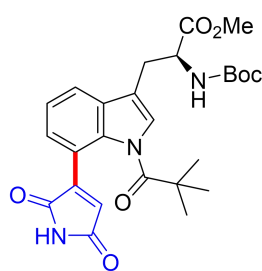
Rhodamine B derivative **P1** (20mg, 0.03 mmol) was added to 1 mL 4M HCl/dioxane for 30 min. Then the mixture was concentrated in vacuum, and ice ether was added to obtain the white solid, which dried in vacuum to get **P2**. **P2** (0.03 mmol), Boc-Cys(Trt)-OH (17mg, 0.04 mmol), EDCI (9 mg, 1.5 eq) and HOBT (6 mg, 1.5 eq) were dissolved in 1 mL DMF, then DIEA (12 mg, 0.09 mmol) was added, stirred in room temperature overnight. Upon completion, 10 mL EtOAc and 10 mL H₂O were added, and the organic layer was separated and washed with 10 mL 1M HCl, 10 mL saturated sodium bicarbonate, 10 mL saturated sodium chloride and dried with anhydrous sodium sulfate, filtered, concentrated in vacuum to get product **P3** without further purified for the next step. TFA (8 µL, 4% v/v) was added to a solution of **P3** (20 mg) and triethylsilane (4 µL, 0.05 mmol) in CH₂Cl₂ (200 µL), and the mixture was stirred for 60 minutes. The mixture was washed with saturated NaHCO₃ solution. Extract the mixture

with CH₂Cl₂, wash the organic layers with brine. Dry the organic layers over Na₂SO₄. Evaporate the solvent under reduced pressure, and further purified by flash column to get product 10mg **10b** in 67% yeild.

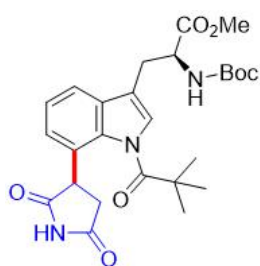
K. General procedure of cell culture and staining experiments

A549 and HeLa cells were cultured in DMEM high glucose media supplemented with 10% fetal bovine serum, 1% Penstrep, 0.2% Amphotericin B. The cells were grown overnight at 37 °C incubator with 5% CO₂. A549 and HeLa cells were seeded at a density of 3×10⁵ cells in 35 mm dish and kept overnight prior to cell imaging studies. After 24h, the cells were washed twice with warm DMEM media, incubated at 37 °C with 5 μM peptides for 60 min, and then pretreated with 5 μM probe for 15 min. Images were taken using the Zeiss LSM 800 confocal fluorescence microscope.

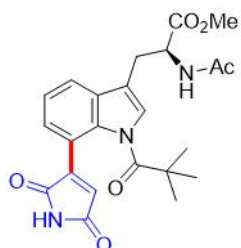
L. Structural characterization of amino acids, peptides and cyclic peptides



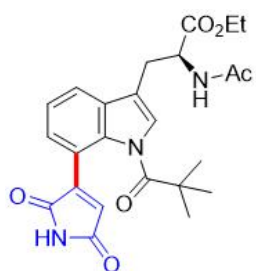
¹H NMR (500 MHz, CDCl₃) δ 8.13 (s, 1H), 7.61 (d, *J* = 7.5 Hz, 1H), 7.55 (s, 1H), 7.31 (t, *J* = 7.5 Hz, 1H), 7.28 (dd, *J* = 7.0, 1.5 Hz, 1H), 6.45 (d, *J* = 1.5 Hz, 1H), 5.26 (d, *J* = 8.3 Hz, 1H), 4.74 (q, *J* = 6.5 Hz, 1H), 3.71 (s, 3H), 3.25 (ddd, *J* = 52.0, 15.2, 5.9 Hz, 2H), 1.45 (s, 9H), 1.44 (s, 9H). **¹³C NMR** (126 MHz, CDCl₃) δ 178.66, 172.32, 171.21, 170.77, 155.13, 150.32, 133.55, 131.54, 127.52, 124.78, 123.37, 121.98, 121.29, 117.48, 115.23, 80.21, 53.30, 52.46, 41.27, 28.39, 28.31, 27.66. **HRMS** (ESI) *m/z* calcd for C₂₆H₃₁N₃O₇Na (M + Na)⁺ 520.2054, found 520.2049.



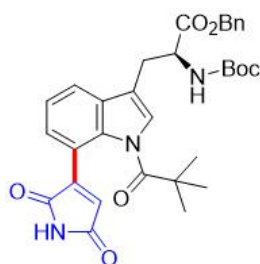
¹H NMR (400 MHz, CDCl₃) δ 8.60 (s, 1H), 7.52 (s, 1H), 7.48 (d, *J* = 7.6 Hz, 1H), 7.31 (t, *J* = 7.6 Hz, 1H), 7.17 (d, *J* = 7.5 Hz, 1H), 5.19 (d, *J* = 8.2 Hz, 1H), 4.74 (q, *J* = 6.4 Hz, 1H), 4.61 (s, 1H), 3.73 (s, 3H), 3.40 (dd, *J* = 17.7, 9.6 Hz, 1H), 3.33 – 3.13 (m, 2H), 3.04 (d, *J* = 18.4 Hz, 1H), 1.53 (s, 9H), 1.45 (s, 9H). **¹³C NMR** (101 MHz, CDCl₃) δ 179.06, 178.65, 176.96, 172.38, 172.35, 155.13, 132.44, 124.77, 124.15, 118.71, 115.63, 80.21, 53.48, 53.21, 52.55, 41.63, 38.42, 38.34, 28.99, 28.35, 27.65. **HRMS** (ESI) *m/z* calcd for C₂₆H₃₃N₃O₇Na (M + Na)⁺ 522.2211, found 522.2219.



¹H NMR (600 MHz, CDCl₃) δ 7.94 (s, 1H), 7.61 (dd, *J* = 7.7, 1.3 Hz, 1H), 7.54 (s, 1H), 7.33 (t, *J* = 7.6 Hz, 1H), 7.29 (d, *J* = 7.8 Hz, 1H), 6.46 (d, *J* = 1.4 Hz, 1H), 6.28 (d, *J* = 7.9 Hz, 1H), 5.05 (dt, *J* = 7.9, 5.7 Hz, 1H), 3.75 (s, 3H), 3.30 (ddd, *J* = 55.3, 15.2, 5.6 Hz, 2H), 2.01 (s, 3H), 1.46 (s, 9H). **¹³C NMR** (151 MHz, CDCl₃) δ 178.73, 172.22, 171.08, 170.70, 169.99, 150.29, 133.54, 131.54, 127.62, 124.75, 123.47, 122.01, 121.22, 117.51, 115.10, 52.64, 52.14, 41.29, 28.36, 27.40, 27.11, 23.16. **HRMS** (ESI) *m/z* calcd for C₂₃H₂₅N₃O₆Na (M + Na)⁺ 462.1636, found 462.1640.

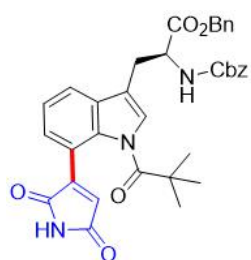


¹H NMR (600 MHz, CDCl₃) δ 8.15 (s, 1H), 7.62 (dd, *J* = 7.7, 1.3 Hz, 1H), 7.55 (s, 1H), 7.32 (t, *J* = 7.6 Hz, 1H), 7.28 (dd, *J* = 7.4, 1.2 Hz, 1H), 6.44 (d, *J* = 1.5 Hz, 1H), 6.37 (d, *J* = 7.9 Hz, 1H), 5.02 (dt, *J* = 8.2, 5.9 Hz, 1H), 4.29 – 4.06 (m, 2H), 3.28 (ddd, *J* = 50.3, 15.1, 5.9 Hz, 2H), 2.00 (s, 3H), 1.45 (s, 9H), 1.24 (t, *J* = 7.1 Hz, 3H). **¹³C NMR** (151 MHz, CDCl₃) δ 178.76, 171.89, 171.31, 170.84, 170.14, 150.24, 133.53, 131.55, 127.59, 124.71, 123.42, 122.01, 121.24, 117.50, 115.20, 61.92, 52.15, 41.27, 28.33, 27.45, 23.12, 14.06. **HRMS** (ESI) *m/z* calcd for C₂₄H₂₇N₃O₆Na (M + Na)⁺ 476.1792, found 476.1796.



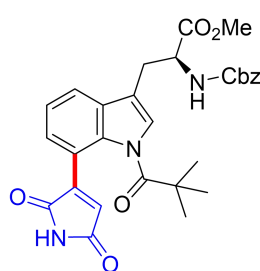
¹H NMR (500 MHz, CDCl₃) δ 7.77 – 7.57 (m, 2H), 7.54 (s, 1H), 7.34 (dd, *J* = 5.2, 1.9 Hz, 3H), 7.31 – 7.13 (m, 4H), 6.47 (d, *J* = 1.6 Hz, 1H), 5.31 – 5.01 (m, 3H), 4.79 (q, *J* = 6.6 Hz, 1H), 3.28 (ddd, *J* = 55.8, 15.1, 5.9 Hz, 2H), 1.44 (s, 9H), 1.43 (s, 9H). **¹³C NMR** (151 MHz, CDCl₃) δ 178.69, 171.77, 171.23, 170.75, 155.17, 150.36, 135.00, 134.96, 133.52, 131.58, 128.68, 128.53, 128.10, 127.55, 124.81, 123.41, 121.97, 121.36, 117.46, 115.19, 80.25, 67.37, 53.38, 41.26, 28.39, 28.35, 27.59. **HRMS** (ESI) *m/z* calcd for

C₃₂H₃₅N₃O₇Na (M + Na)⁺ 596.2367, found 596.2368.



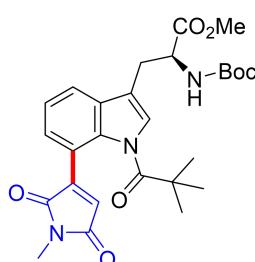
¹H NMR (500 MHz, CDCl₃) δ 7.95 (d, *J* = 1.7 Hz, 1H), 7.57 (dd, *J* = 6.5, 2.6 Hz, 1H), 7.54 (s, 1H), 7.44 – 7.28 (m, 8H), 7.28 – 7.13 (m, 4H), 6.46 (d, *J* = 1.6 Hz, 1H), 5.59 (d, *J* = 8.2 Hz, 1H), 5.33 – 5.01 (m, 4H), 4.88 (dt, *J* = 8.2, 5.9 Hz, 1H), 3.62 – 2.97 (m, 2H), 1.40 (s, 9H). **¹³C NMR** (126 MHz, CDCl₃) δ 178.64, 171.45, 171.14, 170.66, 155.78, 150.32, 136.06, 134.82, 133.53, 131.44, 128.70, 128.59, 128.56, 128.26, 128.13, 128.12, 127.58, 124.84, 123.44, 121.99, 121.25, 117.49, 114.91, 67.51, 67.15, 53.80, 41.24, 28.33,

27.73. **HRMS** (ESI) *m/z* calcd for C₃₅H₃₃N₃O₇Na (M + Na)⁺ 630.2211, found 630.2224.



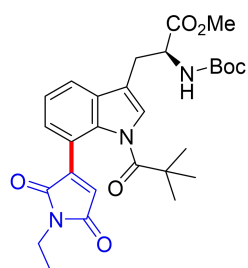
¹H NMR (600 MHz, CDCl₃) δ 8.17 (s, 1H), 7.60 (dd, *J* = 6.6, 2.5 Hz, 1H), 7.57 (s, 1H), 7.34 (q, *J* = 5.1 Hz, 5H), 7.28 (q, *J* = 5.0, 4.6 Hz, 2H), 6.45 (d, *J* = 1.5 Hz, 1H), 5.63 (d, *J* = 8.2 Hz, 1H), 5.14 (q, *J* = 12.2 Hz, 2H), 4.82 (q, *J* = 6.5 Hz, 1H), 3.72 (s, 3H), 3.29 (ddd, *J* = 52.4, 15.1, 5.6 Hz, 2H), 1.43 (s, 9H). **¹³C NMR** (151 MHz, CDCl₃) δ 178.70, 172.09, 171.34, 170.86, 155.82, 150.27, 136.09, 133.55, 131.42, 128.55, 128.25, 128.13, 127.60, 124.84, 123.45, 122.02, 121.23, 117.51, 115.01, 67.13, 53.72, 52.63, 41.26, 28.35,

27.74. **HRMS** (ESI) *m/z* calcd for C₂₉H₂₉N₃O₇Na (M + Na)⁺ 554.1898, found 554.1897.



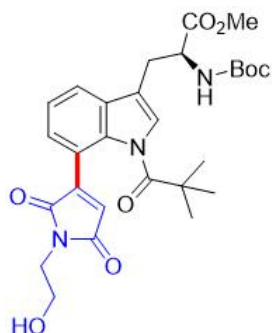
¹H NMR (600 MHz, DMSO) δ 7.88 (s, 1H), 7.72 (dd, *J* = 6.8, 2.2 Hz, 1H), 7.43 (d, *J* = 8.1 Hz, 1H), 7.41 – 7.34 (m, 2H), 6.86 (s, 1H), 4.35 (ddd, *J* = 10.2, 8.1, 4.6 Hz, 1H), 3.66 (s, 3H), 3.23 – 2.99 (m, 2H), 2.90 (s, 3H), 1.40 (s, 9H), 1.32 (s, 9H). **¹³C NMR** (151 MHz, DMSO) δ 179.03, 172.99, 171.55, 170.87, 155.84, 148.95, 135.06, 133.25, 131.28, 127.47, 126.05, 123.66, 122.30, 121.43, 117.86, 116.17, 78.78, 66.16, 53.71, 52.42, 41.31, 28.57, 28.25, 27.39, 26.34, 23.85. **HRMS** (ESI) *m/z* calcd for C₂₇H₃₃N₃O₇Na

(M + Na)⁺ 534.2211, found 534.2201.



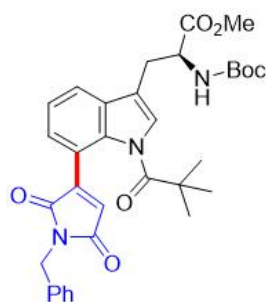
¹H NMR (600 MHz, DMSO) δ 7.90 (s, 1H), 7.72 (dd, *J* = 6.6, 2.4 Hz, 1H), 7.44 (d, *J* = 8.1 Hz, 1H), 7.40 – 7.34 (m, 2H), 6.83 (s, 1H), 4.35 (ddd, *J* = 10.3, 8.1, 4.6 Hz, 1H), 3.66 (s, 3H), 3.45 (q, *J* = 7.2 Hz, 2H), 3.23 – 2.99 (m, 2H), 1.40 (s, 9H), 1.32 (s, 9H), 1.12 (t, *J* = 7.2 Hz, 3H). **¹³C NMR** (151 MHz, DMSO) δ 178.69, 172.98, 171.41, 170.54, 155.84, 149.07, 133.26, 131.31, 127.71, 126.12, 123.72, 122.07, 121.38, 118.01, 116.28, 78.79, 53.70, 52.42, 41.30, 32.60, 28.57, 28.26, 27.38, 26.33, 14.27. **HRMS** (ESI) *m/z* calcd for

C₂₈H₃₅N₃O₇Na (M + Na)⁺ 548.2367, found 548.2369.



¹H NMR (600 MHz, CDCl₃) δ 7.63 (d, *J* = 7.7 Hz, 1H), 7.58 (s, 1H), 7.34 (t, *J* = 7.6 Hz, 1H), 7.30 (d, *J* = 7.1 Hz, 1H), 6.51 (s, 1H), 5.18 (d, *J* = 8.2 Hz, 1H), 4.74 (q, *J* = 6.6 Hz, 1H), 3.83 (t, *J* = 5.1 Hz, 2H), 3.76 (dd, *J* = 5.8, 4.6 Hz, 2H), 3.73 (s, 3H), 3.27 (ddd, *J* = 62.3, 15.3, 5.6 Hz, 2H), 1.47 (s, 9H), 1.46 (s, 9H). **¹³C NMR** (151 MHz, CDCl₃) δ 178.52, 172.24, 171.67, 171.10, 155.09, 149.83, 134.21, 133.57, 131.63, 127.65, 124.84, 123.54,

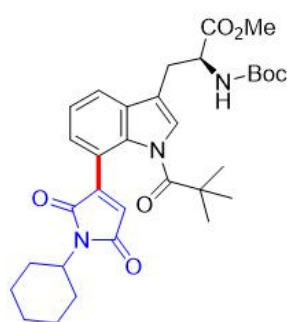
121.33, 121.00, 117.63, 115.47, 80.21, 61.13, 60.83, 53.27, 52.50, 41.25, 40.99, 40.67, 28.47, 28.33, 27.71. **HRMS** (ESI) m/z calcd for $C_{28}H_{35}N_3O_8Na$ ($M + Na$)⁺ 564.2316, found 564.2317.



¹H NMR (600 MHz, $CDCl_3$) δ 7.62 (d, J = 7.5 Hz, 1H), 7.56 (s, 1H), 7.43 – 7.37 (m, 2H), 7.36 – 7.29 (m, 4H), 7.28 – 7.21 (m, 1H), 6.52 (s, 1H), 5.17 (d, J = 7.6 Hz, 1H), 4.88 – 4.72 (m, 1H), 4.71 (s, 2H), 3.73 (s, 3H), 3.27 (ddd, J = 58.0, 15.3, 5.5 Hz, 2H), 1.46 (s, 9H), 1.37 (s, 9H). **¹³C NMR** (151 MHz, $CDCl_3$) δ 178.33, 172.25, 170.95, 170.30, 155.08, 149.68, 136.42, 133.63, 131.59, 128.56, 128.21, 127.67, 127.58, 124.81, 123.42, 121.21, 120.96, 117.86, 115.23, 80.17, 53.30, 52.48, 41.40, 41.12, 28.38, 28.34, 27.70.

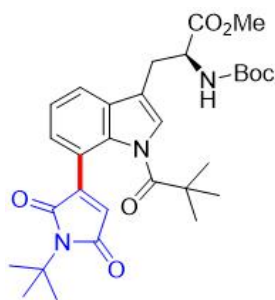
HRMS (ESI) m/z calcd for $C_{33}H_{37}N_3O_7Na$ ($M + Na$)⁺ 610.2524, found

610.2534.

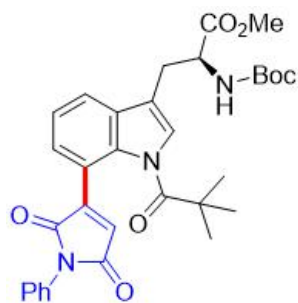


¹H NMR (600 MHz, $CDCl_3$) δ 7.61 (d, J = 7.6 Hz, 1H), 7.57 (s, 1H), 7.32 (t, J = 7.6 Hz, 1H), 7.28 (dd, J = 7.4, 1.3 Hz, 1H), 6.42 (s, 1H), 5.16 (d, J = 8.3 Hz, 1H), 4.74 (d, J = 7.2 Hz, 1H), 3.93 (tt, J = 12.3, 3.8 Hz, 1H), 3.73 (s, 3H), 3.27 (ddd, J = 55.3, 15.4, 5.5 Hz, 2H), 2.10 (qd, J = 12.7, 3.6 Hz, 2H), 1.85 (dt, J = 13.3, 3.3 Hz, 2H), 1.79 – 1.70 (m, 2H), 1.66 (d, J = 9.4 Hz, 1H), 1.48 (s, 9H), 1.46 (s, 9H), 1.34 (dt, J = 13.2, 3.4 Hz, 2H), 1.26 (td, J = 9.3, 4.6 Hz, 1H). **¹³C NMR** (151 MHz, $CDCl_3$) δ 178.23, 172.26, 171.45, 170.56, 155.08, 149.12, 133.68, 131.55, 127.67, 124.75, 123.39, 120.98, 118.10, 115.17, 80.16, 53.31, 52.48, 50.71, 41.20, 30.13,

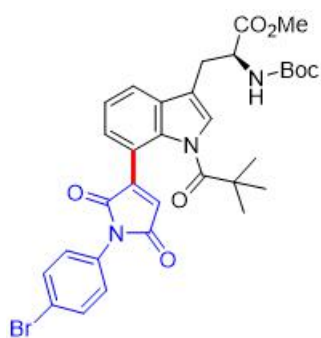
28.47, 28.34, 27.71, 26.04, 25.15. **HRMS** (ESI) m/z calcd for $C_{32}H_{41}N_3O_7Na$ ($M + Na$)⁺ 602.2837, found 602.2836.



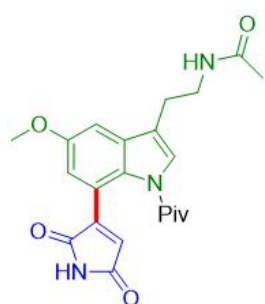
¹H NMR (600 MHz, $CDCl_3$) δ 7.67 – 7.50 (m, 2H), 7.32 (t, J = 7.6 Hz, 1H), 7.26 (dd, J = 7.4, 1.2 Hz, 1H), 6.35 (s, 1H), 5.16 (d, J = 8.1 Hz, 1H), 4.74 (q, J = 6.5 Hz, 1H), 3.73 (s, 3H), 3.26 (ddd, J = 57.1, 15.3, 5.5 Hz, 2H), 1.62 (s, 9H), 1.50 (s, 9H), 1.46 (s, 9H). **¹³C NMR** (151 MHz, $CDCl_3$) δ 177.72, 172.77, 172.27, 171.61, 155.08, 148.96, 133.82, 131.54, 127.81, 124.76, 123.43, 121.08, 120.84, 118.34, 115.30, 80.16, 57.19, 53.28, 52.48, 41.14, 29.07, 28.52, 28.34, 27.67. **HRMS** (ESI) m/z calcd for $C_{30}H_{39}N_3O_7Na$ ($M + Na$)⁺ 576.2680, found 576.2692.



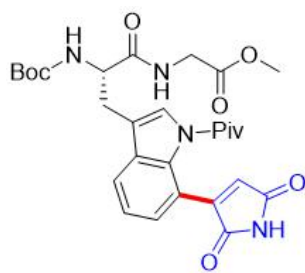
¹H NMR (600 MHz, DMSO) δ 7.91 (s, 1H), 7.76 (dd, J = 7.6, 1.4 Hz, 1H), 7.57 – 7.49 (m, 2H), 7.49 – 7.39 (m, 4H), 7.36 – 7.27 (m, 2H), 7.04 (s, 1H), 4.36 (ddd, J = 10.3, 8.1, 4.7 Hz, 1H), 3.66 (s, 3H), 3.29 – 2.95 (m, 2H), 1.35 (s, 9H), 1.32 (s, 9H). **¹³C NMR** (151 MHz, DMSO) δ 178.80, 172.98, 170.51, 169.58, 155.84, 149.15, 133.31, 132.19, 131.35, 129.53, 128.42, 127.86, 127.38, 126.16, 123.79, 122.33, 121.58, 117.83, 116.41, 78.79, 53.70, 52.42, 41.29, 28.57, 28.25, 26.34. **HRMS** (ESI) m/z calcd for $C_{32}H_{35}N_3O_7Na$ ($M + Na$)⁺ 596.2376, found 596.2386.



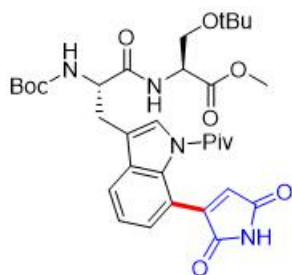
¹H NMR (500 MHz, CDCl₃) δ 7.65 (dq, *J* = 7.6, 3.9 Hz, 1H), 7.62 – 7.58 (m, 2H), 7.57 (s, 1H), 7.35 (q, *J* = 3.8, 2.9 Hz, 2H), 7.32 – 7.23 (m, 2H), 6.62 (s, 1H), 5.20 (d, *J* = 8.2 Hz, 1H), 4.74 (q, *J* = 6.5 Hz, 1H), 3.72 (s, 3H), 3.27 (ddd, *J* = 53.5, 15.3, 5.6 Hz, 2H), 1.45 (s, 9H), 1.40 (s, 9H). **¹³C NMR** (126 MHz, CDCl₃) δ 178.59, 172.22, 169.74, 168.95, 155.08, 149.84, 133.61, 132.21, 131.63, 130.92, 127.86, 127.64, 124.85, 123.52, 121.50, 121.43, 120.96, 117.46, 115.42, 80.18, 53.28, 52.47, 41.21, 28.43, 28.32, 27.73. **HRMS** (ESI) *m/z* calcd for C₃₂H₃₄BrN₃O₇Na (M + Na)⁺ 674.1472, found 674.1471.



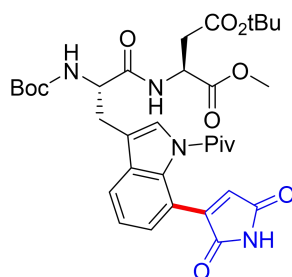
¹H NMR (600 MHz, CDCl₃) δ 7.60 (s, 1H), 7.53 (s, 1H), 7.12 (d, *J* = 2.6 Hz, 1H), 6.90 (d, *J* = 2.5 Hz, 1H), 6.45 (d, *J* = 1.6 Hz, 1H), 5.76 (t, *J* = 6.2 Hz, 1H), 3.90 (s, 3H), 3.60 (q, *J* = 6.6 Hz, 2H), 2.92 (td, *J* = 6.8, 1.0 Hz, 2H), 1.98 (s, 3H), 1.45 (s, 9H). **¹³C NMR** (151 MHz, CDCl₃) δ 178.33, 170.50, 156.17, 150.22, 132.67, 124.60, 122.06, 118.29, 117.60, 115.82, 103.95, 55.95, 41.16, 38.87, 28.45, 25.22, 23.38. **HRMS** (ESI) *m/z* calcd for C₂₂H₂₅N₃O₅Na (M + Na)⁺ 434.1686, found 434.1689.



¹H NMR (600 MHz, CDCl₃) δ 7.73 (d, *J* = 7.6 Hz, 1H), 7.69 (s, 1H), 7.63 (s, 1H), 7.34 (t, *J* = 7.6 Hz, 1H), 7.31 – 7.26 (m, 1H), 6.64 (t, *J* = 5.5 Hz, 1H), 6.46 (d, *J* = 1.5 Hz, 1H), 5.27 (d, *J* = 8.5 Hz, 1H), 4.59 (s, 1H), 3.98 (d, *J* = 5.2 Hz, 2H), 3.73 (s, 3H), 3.24 (d, *J* = 6.3 Hz, 2H), 1.45 (s, 18H). **¹³C NMR** (151 MHz, CDCl₃) δ 178.74, 171.46, 170.92, 169.77, 150.36, 133.58, 131.44, 127.57, 125.32, 123.48, 121.88, 121.47, 117.38, 115.51, 80.61, 54.03, 52.41, 41.30, 41.16, 28.55, 28.35, 28.29, 27.73. **HRMS** (ESI) *m/z* calcd for C₂₈H₃₄N₄O₈Na (M + Na)⁺ 577.2269, found 577.2270.

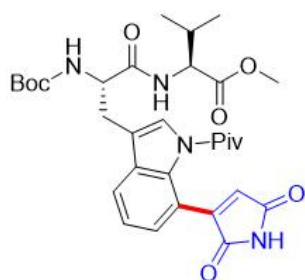


¹H NMR (500 MHz, CDCl₃) δ 7.91 (s, 1H), 7.71 (dd, *J* = 7.8, 1.3 Hz, 1H), 7.67 (s, 1H), 7.31 (t, *J* = 7.6 Hz, 1H), 7.26 (dd, *J* = 7.3, 1.3 Hz, 1H), 6.76 (d, *J* = 8.3 Hz, 1H), 6.43 (d, *J* = 1.1 Hz, 1H), 5.31 (d, *J* = 8.5 Hz, 1H), 4.66 (dt, *J* = 8.3, 3.1 Hz, 2H), 3.79 (dd, *J* = 9.1, 3.0 Hz, 1H), 3.71 (s, 3H), 3.51 (dd, *J* = 9.2, 3.2 Hz, 1H), 3.38 – 3.11 (m, 2H), 1.44 (s, 9H), 1.43 (s, 9H), 1.09 (s, 9H). **¹³C NMR** (151 MHz, CDCl₃) δ 178.78, 171.25, 171.04, 170.64, 170.52, 155.38, 150.42, 133.56, 131.73, 127.38, 125.33, 123.35, 121.89, 121.52, 117.35, 115.43, 80.19, 73.61, 61.68, 53.81, 52.96, 52.44, 41.28, 28.36, 28.32, 27.94, 27.21. **HRMS** (ESI) *m/z* calcd for C₃₃H₄₄N₄O₉Na (M + Na)⁺ 663.3001, found 663.3003.

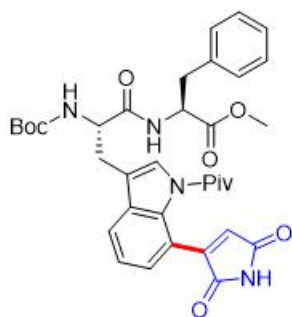


¹H NMR (500 MHz, CDCl₃) δ 7.92 (s, 1H), 7.71 (dd, *J* = 7.7, 1.4 Hz, 1H), 7.66 (s, 1H), 7.31 (t, *J* = 7.6 Hz, 1H), 7.28 – 7.23 (m, 1H), 6.99 (d, *J* = 8.4 Hz, 1H), 6.42 (d, *J* = 1.5 Hz, 1H), 5.28 (d, *J* = 8.3 Hz, 1H), 4.79 (dt, *J* = 8.7, 4.5 Hz, 1H), 4.70 – 4.51 (m, 1H), 3.70 (s, 3H), 3.25 (ddd, *J* = 54.4, 15.1, 6.2 Hz, 2H), 2.92 (dd, *J* = 17.0, 4.5 Hz, 1H), 2.66 (dd, *J* = 17.0, 4.6 Hz, 1H), 1.44 (s, 9H), 1.42 (s, 9H), 1.39 (s, 9H). **¹³C NMR** (126 MHz, CDCl₃) δ 178.68, 171.17, 170.98, 170.84, 170.57, 169.88, 155.34, 150.39,

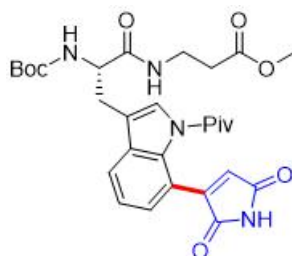
133.59, 131.59, 127.41, 125.32, 123.36, 121.90, 121.48, 117.37, 115.34, 82.00, 80.29, 53.90, 52.69, 48.67, 41.28, 37.27, 28.35, 28.28, 27.94, 27.80. **HRMS** (ESI) m/z calcd for $C_{34}H_{44}N_4O_{10}Na$ ($M + Na$)⁺ 691.2950, found 691.2950.



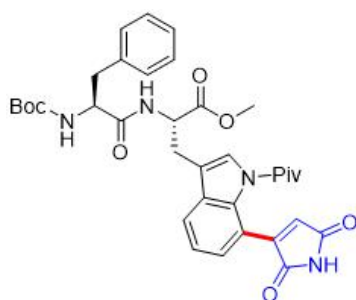
¹H NMR (600 MHz, $CDCl_3$) δ 8.05 (s, 1H), 7.70 (d, $J = 7.7$ Hz, 1H), 7.62 (s, 1H), 7.32 (t, $J = 7.5$ Hz, 1H), 7.28 (d, $J = 7.5$ Hz, 1H), 6.65 (d, $J = 8.6$ Hz, 1H), 6.44 (s, 1H), 5.33 (d, $J = 8.4$ Hz, 1H), 4.59 (q, $J = 7.6$ Hz, 1H), 4.48 (dd, $J = 8.7, 5.0$ Hz, 1H), 3.69 (s, 3H), 3.22 (qd, $J = 15.9, 15.2, 6.5$ Hz, 2H), 2.14 (h, $J = 6.7$ Hz, 1H), 1.44 (d, $J = 3.8$ Hz, 18H), 0.87 (dd, $J = 22.3, 6.8$ Hz, 6H). **¹³C NMR** (151 MHz, $CDCl_3$) δ 178.73, 171.81, 171.29, 171.21, 170.68, 155.67, 150.32, 133.60, 131.46, 127.48, 125.10, 123.43, 121.93, 121.43, 117.41, 115.56, 80.52, 57.26, 54.08, 52.21, 41.28, 31.18, 28.37, 28.30, 27.16, 18.86, 17.64. **HRMS** (ESI) m/z calcd for $C_{31}H_{40}N_4O_8Na$ ($M + Na$)⁺ 619.2738, found 619.2743.



¹H NMR (500 MHz, $CDCl_3$) δ 8.00 (s, 1H), 7.70 (dd, $J = 7.8, 1.4$ Hz, 1H), 7.61 (s, 1H), 7.32 (t, $J = 7.6$ Hz, 1H), 7.28 (dd, $J = 7.4, 1.3$ Hz, 1H), 7.20 (qd, $J = 4.8, 1.6$ Hz, 3H), 7.03 – 6.89 (m, 2H), 6.50 (d, $J = 7.6$ Hz, 1H), 6.43 (d, $J = 1.5$ Hz, 1H), 5.22 (d, $J = 8.4$ Hz, 1H), 4.76 (d, $J = 6.6$ Hz, 1H), 4.61 – 4.43 (m, 1H), 3.67 (s, 3H), 3.18 (d, $J = 6.5$ Hz, 2H), 3.11 – 2.92 (m, 2H), 1.44 (s, 18H). **¹³C NMR** (151 MHz, $CDCl_3$) δ 178.74, 171.39, 171.28, 170.81, 170.66, 155.42, 150.30, 135.48, 133.61, 131.41, 129.14, 128.57, 127.50, 127.17, 125.22, 123.45, 121.95, 121.54, 117.44, 115.45, 80.44, 53.92, 53.34, 52.39, 41.30, 37.78, 28.38, 28.31, 27.69. **HRMS** (ESI) m/z calcd for $C_{35}H_{40}N_4O_8Na$ ($M + Na$)⁺ 667.2738, found 667.2745.

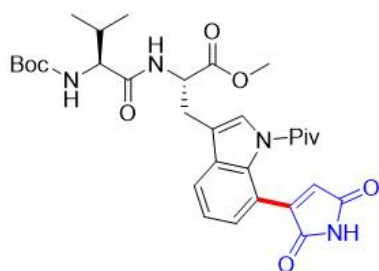


¹H NMR (600 MHz, $CDCl_3$) δ 7.77 (s, 1H), 7.70 (d, $J = 7.7$ Hz, 1H), 7.61 (s, 1H), 7.34 (t, $J = 7.6$ Hz, 1H), 7.29 (d, $J = 9.9$ Hz, 1H), 6.59 (t, $J = 6.1$ Hz, 1H), 6.46 (s, 1H), 5.21 (d, $J = 8.6$ Hz, 1H), 4.64 – 4.33 (m, 1H), 3.62 (s, 3H), 3.44 (tt, $J = 13.7, 7.2$ Hz, 2H), 3.21 (q, $J = 8.8$ Hz, 2H), 2.44 (dt, $J = 17.2, 5.9$ Hz, 1H), 2.35 (d, $J = 16.7$ Hz, 1H), 1.46 (s, 9H), 1.44 (s, 9H). **¹³C NMR** (151 MHz, $CDCl_3$) δ 178.70, 172.55, 171.12, 171.01, 170.54, 155.45, 150.36, 133.57, 131.43, 127.56, 125.04, 123.51, 121.89, 121.47, 117.45, 115.64, 80.47, 54.37, 51.81, 41.31, 34.90, 33.43, 28.38, 28.29, 27.69. **HRMS** (ESI) m/z calcd for $C_{29}H_{36}N_4O_8Na$ ($M + Na$)⁺ 591.2425, found 591.2429.

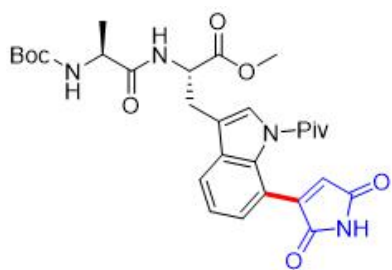


¹H NMR (600 MHz, $CDCl_3$) δ 7.60 – 7.52 (m, 2H), 7.37 (s, 1H), 7.31 – 7.28 (m, 2H), 7.26 (dd, $J = 7.9, 6.2$ Hz, 2H), 7.23 – 7.17 (m, 3H), 6.50 (d, $J = 7.9$ Hz, 1H), 6.46 (d, $J = 1.6$ Hz, 1H), 4.97 (dt, $J = 7.6, 5.7$ Hz, 2H), 4.45 – 4.28 (m, 1H), 3.66 (s, 3H), 3.24 (d, $J = 5.7$ Hz, 2H), 3.08 – 3.03 (m, 2H), 1.46 (s, 9H), 1.39 (s, 9H). **¹³C NMR** (151 MHz, $CDCl_3$) δ 178.72, 171.40, 171.12, 170.69, 170.27, 150.36, 133.55, 131.43, 129.42, 129.24, 128.68, 127.60, 127.07, 124.80, 123.45, 121.95, 121.34, 119.67, 118.50, 117.46, 114.94,

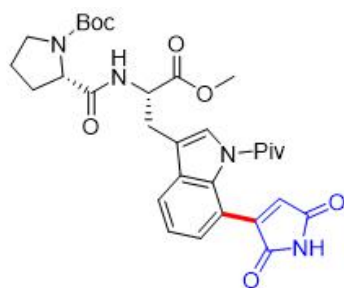
80.34, 52.52, 52.15, 41.29, 38.26, 28.36, 28.19, 27.65. **HRMS** (ESI) m/z calcd for $C_{35}H_{40}N_4O_8Na$ ($M + Na$)⁺ 667.2738, found 667.2745.



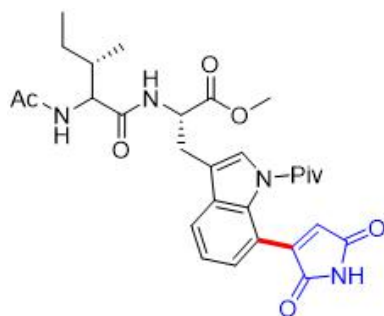
¹H NMR (600 MHz, DMSO) δ 10.83 (s, 1H), 8.47 (d, $J = 7.5$ Hz, 1H), 7.84 (s, 1H), 7.70 (dd, $J = 7.1, 2.0$ Hz, 1H), 7.43 – 7.31 (m, 2H), 6.71 (s, 1H), 6.47 (d, $J = 9.1$ Hz, 1H), 4.72 (td, $J = 8.1, 5.2$ Hz, 1H), 3.85 (dd, $J = 9.1, 6.8$ Hz, 1H), 3.61 (s, 3H), 3.27 – 3.08 (m, 2H), 1.94 – 1.82 (m, 1H), 1.39 (s, 9H), 1.36 (s, 9H), 0.77 (dd, $J = 6.8, 5.3$ Hz, 6H). **¹³C NMR** (151 MHz, DMSO) δ 179.01, 172.95, 172.30, 172.27, 172.08, 155.67, 149.35, 135.71, 133.38, 131.13, 127.57, 125.74, 123.56, 123.14, 117.98, 115.64, 78.47, 59.71, 52.39, 51.90, 51.90, 41.34, 31.30, 28.60, 28.27, 26.67, 19.44, 18.42. **HRMS** (ESI) m/z calcd for $C_{31}H_{40}N_4O_8Na$ ($M + Na$)⁺ 619.2738, found 619.2742.



¹H NMR (600 MHz, DMSO) δ 10.83 (s, 1H), 8.37 (dd, $J = 7.4, 2.6$ Hz, 1H), 7.86 (s, 1H), 7.70 (dd, $J = 7.1, 1.9$ Hz, 1H), 7.43 – 7.32 (m, 2H), 6.79 (d, $J = 7.7$ Hz, 1H), 6.71 (s, 1H), 4.69 (td, $J = 7.9, 5.5$ Hz, 1H), 4.04 (qt, $J = 7.0, 4.0$ Hz, 1H), 3.61 (s, 3H), 3.27 – 3.10 (m, 2H), 1.40 (s, 9H), 1.36 (s, 9H), 1.15 (d, $J = 7.1$ Hz, 3H). **¹³C NMR** (151 MHz, DMSO) δ 179.05, 173.53, 172.95, 172.28, 155.35, 149.37, 136.73, 133.37, 131.22, 127.53, 125.89, 123.52, 123.15, 121.27, 117.97, 115.56, 99.99, 78.45, 52.45, 52.09, 49.89, 41.36, 28.63, 28.53, 28.30, 26.74, 18.71. **HRMS** (ESI) m/z calcd for $C_{29}H_{36}N_4O_8Na$ ($M + Na$)⁺ 591.2425, found 591.2423.

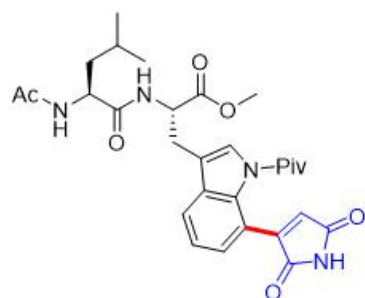


¹H NMR (600 MHz, $CDCl_3$) δ 7.79 – 7.59 (m, 2H), 7.54 (t, $J = 3.9$ Hz, 1H), 7.45 – 7.22 (m, 3H), 6.46 (s, 1H), 4.96 (d, $J = 60.6$ Hz, 1H), 4.37 – 4.11 (m, 1H), 3.71 (s, 3H), 3.43 – 3.18 (m, 4H), 2.16 – 1.91 (m, 2H), 1.78 (d, $J = 42.3$ Hz, 2H), 1.48 (s, 9H), 1.40 (s, 9H). **¹³C NMR** (151 MHz, DMSO) δ 172.95, 149.39, 133.48, 131.05, 127.52, 126.27, 123.52, 123.11, 121.12, 118.03, 111.87, 78.83, 60.05, 52.43, 52.14, 46.84, 41.38, 31.33, 28.58, 28.23, 28.16, 26.65, 23.48. **HRMS** (ESI) m/z calcd for $C_{31}H_{38}N_4O_8Na$ ($M + Na$)⁺ 617.2582, found 617.2583.

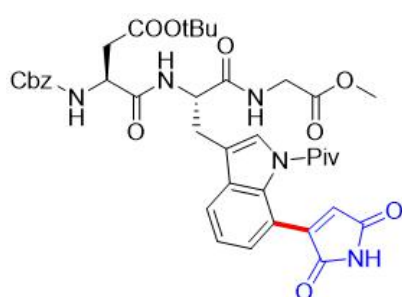


¹H NMR (600 MHz, $CDCl_3$) δ 7.84 (s, 1H), 7.64 (dd, $J = 7.8, 1.2$ Hz, 1H), 7.61 (s, 1H), 7.34 (t, $J = 7.6$ Hz, 1H), 7.31 – 7.27 (m, 1H), 6.77 (d, $J = 7.9$ Hz, 1H), 6.44 (d, $J = 1.5$ Hz, 1H), 6.20 (d, $J = 8.7$ Hz, 1H), 5.02 (dt, $J = 7.9, 5.9$ Hz, 1H), 4.31 (dd, $J = 8.6, 7.2$ Hz, 1H), 3.72 (s, 3H), 3.28 (dd, $J = 6.0, 3.6$ Hz, 2H), 1.96 (s, 3H), 1.88 – 1.74 (m, 2H), 1.46 (s, 9H), 1.15 (dddd, $J = 16.7, 14.2, 8.3, 4.9$ Hz, 1H), 0.93 (d, $J = 6.8$ Hz, 3H), 0.90 (t, $J = 7.4$ Hz, 3H). **¹³C NMR** (151 MHz, $CDCl_3$) δ 178.77, 171.66, 171.38, 171.11, 170.57, 169.98, 150.25, 133.58, 131.33, 127.62, 124.86, 123.56,

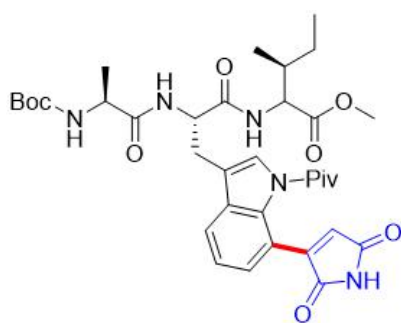
122.03, 121.29, 117.48, 114.92, 57.72, 52.56, 52.01, 41.29, 37.48, 28.34, 27.55, 25.01, 23.10, 15.23, 11.24. **HRMS** (ESI) m/z calcd for $C_{29}H_{36}N_4O_7Na$ ($M + Na$)⁺ 575.2476, found 575.2484.



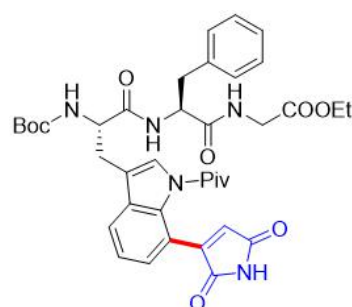
¹H NMR (600 MHz, $CDCl_3$) δ 8.52 (s, 1H), 7.67 – 7.59 (m, 2H), 7.31 (t, J = 7.6 Hz, 1H), 7.25 (dd, J = 7.4, 1.2 Hz, 1H), 7.16 (d, J = 7.8 Hz, 1H), 6.39 (d, J = 1.4 Hz, 1H), 6.35 (d, J = 8.2 Hz, 1H), 4.98 (dt, J = 7.9, 6.2 Hz, 1H), 4.50 (td, J = 8.5, 5.3 Hz, 1H), 3.70 (s, 3H), 3.26 (qd, J = 15.1, 6.0 Hz, 2H), 1.88 (s, 3H), 1.64 (dtd, J = 13.7, 8.0, 6.5, 3.6 Hz, 2H), 1.54 – 1.47 (m, 1H), 1.44 (s, 9H), 0.91 (dd, J = 14.2, 6.1 Hz, 6H). **¹³C NMR** (151 MHz, $CDCl_3$) δ 178.79, 172.50, 171.76, 171.67, 170.93, 170.36, 150.15, 133.57, 131.36, 127.51, 124.93, 123.46, 122.03, 121.30, 117.47, 114.98, 52.54, 52.08, 51.75, 41.28, 41.14, 28.33, 27.44, 24.70, 22.84, 22.82, 22.10. **HRMS** (ESI) m/z calcd for $C_{29}H_{36}N_4O_7Na$ ($M + Na$)⁺ 575.2476, found 575.2483.



¹H NMR (600 MHz, $CDCl_3$) δ 7.79 (d, J = 7.8 Hz, 1H), 7.68 (s, 1H), 7.57 (s, 1H), 7.39 – 7.30 (m, 6H), 7.27 – 7.21 (m, 2H), 6.80 (s, 1H), 6.40 (s, 1H), 5.81 (d, J = 8.3 Hz, 1H), 5.10 (d, J = 12.1 Hz, 1H), 5.02 (d, J = 12.3 Hz, 1H), 4.85 (q, J = 6.9 Hz, 1H), 4.49 (q, J = 6.5 Hz, 1H), 4.03 – 3.84 (m, 2H), 3.70 (s, 3H), 3.26 (qd, J = 14.8, 6.5 Hz, 2H), 2.87 (dd, J = 17.0, 4.8 Hz, 1H), 2.72 (dd, J = 17.0, 6.6 Hz, 1H), 1.44 (s, 9H), 1.41 (s, 9H). **¹³C NMR** (151 MHz, $CDCl_3$) δ 178.73, 170.88, 170.80, 170.66, 170.50, 169.71, 162.60, 150.32, 135.94, 133.63, 131.31, 128.56, 128.30, 128.12, 127.57, 125.56, 123.52, 121.84, 121.63, 117.38, 115.36, 82.16, 67.34, 52.96, 52.33, 51.51, 41.29, 41.13, 37.31, 36.50, 31.46, 28.32, 27.96, 27.18. **HRMS** (ESI) m/z calcd for $C_{39}H_{45}N_5O_{11}Na$ ($M + Na$)⁺ 782.3008, found 782.3021.

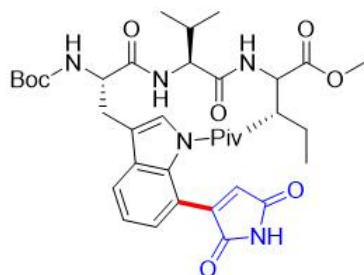


¹H NMR (400 MHz, $CDCl_3$) δ 7.88 (s, 1H), 7.77 (dd, J = 7.7, 1.3 Hz, 1H), 7.67 (s, 1H), 7.34 (t, J = 7.6 Hz, 1H), 7.28 (dd, J = 7.6, 1.2 Hz, 1H), 7.10 (d, J = 8.0 Hz, 1H), 6.51 (d, J = 8.2 Hz, 1H), 6.42 (d, J = 1.5 Hz, 1H), 5.03 (d, J = 7.2 Hz, 1H), 4.89 (q, J = 6.9 Hz, 1H), 4.46 (dd, J = 8.2, 4.7 Hz, 1H), 4.26 – 4.12 (m, 1H), 3.68 (s, 3H), 3.30 – 3.18 (m, 2H), 1.81 (ddt, J = 9.2, 6.7, 4.6 Hz, 1H), 1.44 (s, 9H), 1.40 (s, 9H), 1.34 (d, J = 7.0 Hz, 3H), 1.11 – 0.90 (m, 2H), 0.86 (t, J = 7.4 Hz, 3H), 0.80 (d, J = 6.9 Hz, 3H). **¹³C NMR** (101 MHz, $CDCl_3$) δ 178.80, 172.97, 171.62, 171.21, 170.55, 170.33, 150.26, 133.63, 131.30, 127.56, 125.38, 123.51, 121.92, 121.63, 117.42, 115.22, 80.36, 56.76, 52.77, 52.21, 41.32, 37.65, 28.57, 28.33, 28.22, 25.11, 18.29, 15.33, 11.58. **HRMS** (ESI) m/z calcd for $C_{35}H_{47}N_5O_9Na$ ($M + Na$)⁺ 704.3266, found 704.3267.

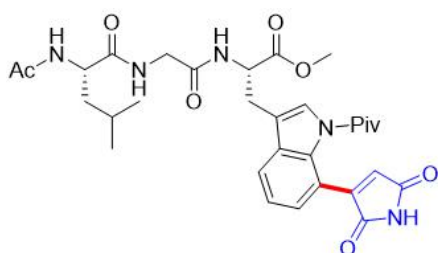


¹H NMR (600 MHz, $CDCl_3$) δ 7.91 (d, J = 6.2 Hz, 1H), 7.67 (d, J = 7.6 Hz, 1H), 7.62 (s, 1H), 7.33 (t, J = 7.6 Hz, 1H), 7.28 (d, J = 7.0 Hz, 1H), 7.21 (t, J = 7.3 Hz, 2H), 7.18 (d, J = 7.0 Hz, 1H), 7.07 (d, J = 7.3 Hz, 2H), 6.78 (s, 1H), 6.56 (t, J = 5.3 Hz, 1H), 6.45 – 6.43 (m,

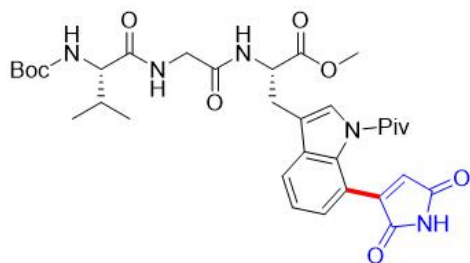
1H), 5.15 (s, 1H), 4.69 (q, $J = 7.2$ Hz, 1H), 4.52 (s, 1H), 4.18 (q, $J = 7.1$ Hz, 2H), 3.91 (ddd, $J = 71.8$, 18.1, 5.4 Hz, 2H), 3.15 (d, $J = 6.0$ Hz, 2H), 3.01 (ddd, $J = 49.3$, 14.4, 5.7 Hz, 2H), 1.45 (s, 9H), 1.39 (s, 9H), 1.26 (d, $J = 7.2$ Hz, 3H). **^{13}C NMR** (151 MHz, CDCl_3) δ 178.69, 171.22, 171.18, 170.70, 170.57, 169.32, 150.26, 136.09, 133.63, 131.32, 129.23, 128.62, 127.57, 127.04, 125.13, 123.50, 121.99, 121.53, 117.48, 115.45, 80.66, 61.50, 54.08, 41.34, 41.31, 37.88, 29.69, 28.38, 28.24, 27.41, 22.69, 14.12. **HRMS** (ESI) m/z calcd for $\text{C}_{38}\text{H}_{45}\text{N}_5\text{O}_9\text{Na}$ ($\text{M} + \text{Na}$) $^+$ 738.3109, found 738.3121.



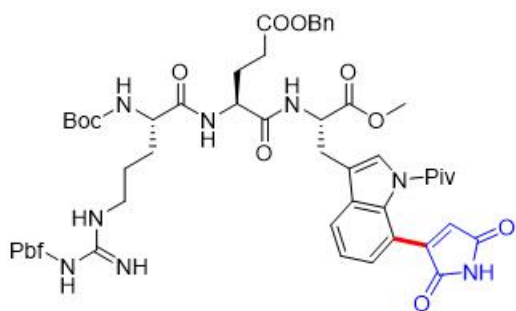
^1H NMR (600 MHz, CDCl_3) δ 7.81 (s, 1H), 7.70 – 7.66 (m, 1H), 7.65 (s, 1H), 7.32 (t, $J = 7.6$ Hz, 1H), 7.29 – 7.26 (m, 1H), 6.99 (d, $J = 8.5$ Hz, 1H), 6.60 (d, $J = 8.4$ Hz, 1H), 6.44 (s, 1H), 5.29 – 5.19 (m, 1H), 4.65 – 4.56 (m, 2H), 4.38 – 4.32 (m, 1H), 3.75 (s, 3H), 3.30 – 3.12 (m, 2H), 2.13 (dt, $J = 13.8$, 9.0, 5.4 Hz, 1H), 2.07 – 1.87 (m, 3H), 1.46 (s, 9H), 1.41 (s, 9H), 0.95 – 0.90 (m, 12H). **^{13}C NMR** (151 MHz, CDCl_3) δ 178.70, 172.09, 171.52, 171.10, 170.68, 170.50, 150.35, 137.30, 133.62, 131.49, 127.51, 125.59, 124.88, 123.59, 123.42, 121.92, 121.41, 118.65, 117.56, 117.41, 115.74, 80.61, 58.72, 58.47, 56.54, 54.00, 52.13, 52.11, 41.30, 41.25, 37.70, 31.92, 31.04, 30.85, 29.69, 29.35, 28.67, 28.43, 28.24, 26.81, 25.22, 22.69, 19.16, 19.06, 18.18, 17.97, 15.47, 14.11, 11.60, 11.57, 8.43. **HRMS** (ESI) m/z calcd for $\text{C}_{37}\text{H}_{51}\text{N}_5\text{O}_9\text{Na}$ ($\text{M} + \text{Na}$) $^+$ 732.3579, found 732.3577.



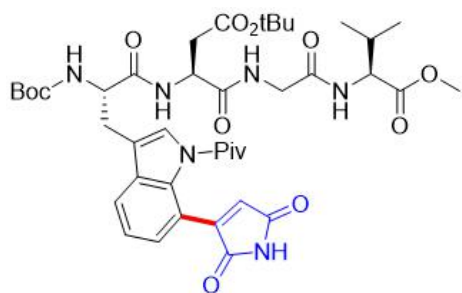
^1H NMR (600 MHz, CDCl_3) δ 8.82 (dt, $J = 24.1$, 11.3 Hz, 1H), 7.59 (dt, $J = 8.0$, 4.5 Hz, 4H), 7.32 – 7.26 (m, 1H), 7.24 (d, $J = 7.3$ Hz, 1H), 6.86 (dt, $J = 14.8$, 7.0 Hz, 1H), 6.40 (s, 1H), 4.93 (q, $J = 6.9$ Hz, 1H), 4.40 (q, $J = 7.5$ Hz, 1H), 4.05 (dd, $J = 16.9$, 6.3 Hz, 1H), 3.79 (dd, $J = 16.8$, 5.0 Hz, 1H), 3.67 (s, 3H), 3.24 (ddd, $J = 43.2$, 15.4, 6.5 Hz, 2H), 2.74 – 2.58 (m, 1H), 1.84 (s, 3H), 1.59 (ddq, $J = 27.3$, 13.8, 6.7 Hz, 2H), 1.41 (s, 9H), 0.88 (dd, $J = 13.0$, 6.2 Hz, 6H). **^{13}C NMR** (151 MHz, CDCl_3) δ 178.84, 173.32, 172.26, 171.95, 171.27, 169.20, 150.16, 133.57, 131.25, 127.48, 124.84, 123.42, 122.02, 121.12, 117.47, 115.32, 52.59, 52.21, 52.06, 42.94, 41.24, 40.62, 28.32, 27.25, 24.69, 22.77, 22.68, 22.04. **HRMS** (ESI) m/z calcd for $\text{C}_{31}\text{H}_{39}\text{N}_5\text{O}_8\text{Na}$ ($\text{M} + \text{Na}$) $^+$ 632.2691, found 632.2701.



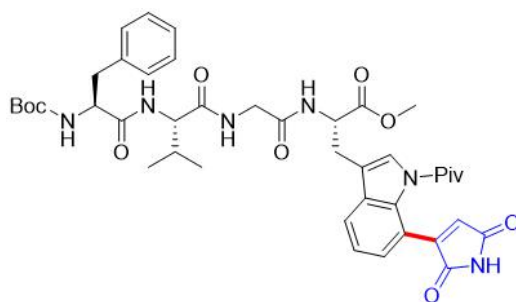
^1H NMR (600 MHz, CDCl_3) δ 8.12 (dd, $J = 20.4$, 9.3 Hz, 1H), 7.61 (d, $J = 8.4$ Hz, 2H), 7.32 (t, $J = 7.6$ Hz, 1H), 7.27 (d, $J = 7.3$ Hz, 1H), 7.19 (t, $J = 7.6$ Hz, 1H), 7.04 – 6.98 (m, 1H), 6.43 (s, 1H), 5.22 (dd, $J = 7.9$, 4.5 Hz, 1H), 4.96 (q, $J = 6.6$ Hz, 1H), 3.93 (qd, $J = 18.9$, 16.2, 10.2 Hz, 3H), 3.70 (s, 3H), 3.26 (ddd, $J = 55.4$, 15.1, 6.2 Hz, 2H), 2.09 – 2.03 (m, 1H), 1.44 (s, 9H), 1.43 (s, 9H), 0.90 (dd, $J = 19.9$, 6.9 Hz, 6H). **^{13}C NMR** (151 MHz, CDCl_3) δ 178.77, 172.47, 171.80, 171.34, 170.77, 168.84, 156.06, 150.22, 133.59, 131.30, 127.57, 124.91, 123.44, 122.00, 121.16, 117.52, 115.03, 80.13, 60.10, 52.59, 52.26, 43.08, 41.28, 31.92, 30.77, 29.68, 29.35, 28.34, 28.31, 27.45, 22.68, 19.22, 17.80, 14.11. **HRMS** (ESI) m/z calcd for $\text{C}_{33}\text{H}_{43}\text{N}_5\text{O}_9\text{Na}$ ($\text{M} + \text{Na}$) $^+$ 676.2953, found 676.2952.



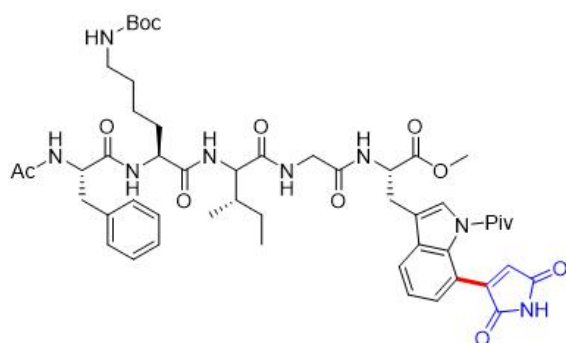
¹H NMR (500 MHz, DMSO) δ 10.83 (s, 1H), 8.63 (d, J = 7.3 Hz, 1H), 7.91 – 7.80 (m, 2H), 7.68 (dt, J = 5.5, 2.1 Hz, 1H), 7.37 – 7.32 (m, 8H), 6.91 (d, J = 8.1 Hz, 1H), 6.69 (s, 1H), 6.39 (s, 1H), 5.08 (s, 2H), 4.71 – 4.65 (m, 1H), 4.39 (q, J = 7.1 Hz, 1H), 3.89 (t, J = 8.0 Hz, 1H), 3.57 (s, 3H), 3.22 – 3.12 (m, 2H), 2.98 (s, 2H), 2.95 (s, 2H), 2.81 (s, 1H), 2.49 (s, 3H), 2.43 (s, 3H), 2.42 – 2.38 (m, 2H), 2.19 (td, J = 7.4, 1.6 Hz, 1H), 2.00 (s, 3H), 1.94 (q, J = 7.9 Hz, 1H), 1.87 – 1.80 (m, 1H), 1.57 (s, 1H), 1.48 (dd, J = 6.6, 1.8 Hz, 1H), 1.43 (s, 1H), 1.40 (s, 9H), 1.36 (d, J = 2.6 Hz, 15H). **¹³C NMR** (126 MHz, DMSO) δ 178.98, 172.92, 172.64, 172.12, 171.57, 157.91, 156.51, 155.81, 149.36, 137.72, 136.61, 134.67, 133.35, 131.90, 131.18, 128.86, 128.45, 128.37, 127.55, 125.77, 124.76, 123.56, 123.12, 121.22, 117.98, 116.71, 115.47, 86.73, 78.66, 65.95, 52.41, 51.65, 42.94, 41.30, 34.13, 31.74, 31.61, 30.10, 29.46, 29.14, 28.74, 28.60, 28.50, 28.23, 24.95, 22.54, 19.39, 18.04, 14.39, 12.71. **HRMS** (ESI) m/z calcd for C₅₇H₇₂N₈O₁₄SNa (M + Na)⁺ 1147.4781, found 1147.4782.



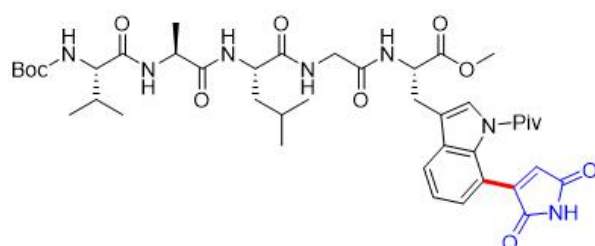
¹H NMR (600 MHz, CDCl₃) δ 7.90 (d, J = 19.9 Hz, 1H), 7.69 (dd, J = 7.7, 1.4 Hz, 1H), 7.63 (s, 1H), 7.48 (d, J = 8.0 Hz, 1H), 7.32 (t, J = 7.6 Hz, 1H), 7.29 (dd, J = 7.4, 1.3 Hz, 2H), 6.87 (d, J = 8.4 Hz, 1H), 6.46 (s, 1H), 5.31 (d, J = 6.6 Hz, 1H), 4.74 – 4.66 (m, 1H), 4.50 (dd, J = 8.7, 5.5 Hz, 2H), 3.93 (qd, J = 16.9, 5.7 Hz, 2H), 3.72 (s, 3H), 3.24 (ddd, J = 54.7, 15.5, 6.4 Hz, 2H), 2.90 (d, J = 16.3 Hz, 1H), 2.60 (dd, J = 16.9, 6.2 Hz, 1H), 2.19 – 2.14 (m, 1H), 1.45 (s, 9H), 1.42 (s, 9H), 1.41 (s, 9H), 0.93 (t, J = 7.1 Hz, 6H). **¹³C NMR** (151 MHz, CDCl₃) δ 178.68, 172.33, 171.63, 171.15, 170.93, 170.62, 170.53, 168.68, 150.20, 133.63, 131.20, 127.65, 125.05, 123.51, 122.06, 121.36, 117.51, 115.43, 81.98, 81.00, 57.37, 54.70, 52.14, 49.88, 43.27, 41.31, 36.52, 31.11, 29.68, 28.60, 28.37, 28.25, 27.96, 18.95, 18.00. **HRMS** (ESI) m/z calcd for C₄₁H₅₆N₆O₁₂Na (M + Na)⁺ 847.3848, found 847.3844.



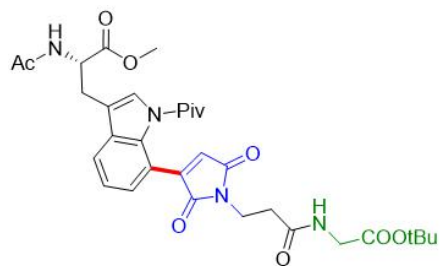
¹H NMR (500 MHz, CDCl₃) δ 7.98 (s, 1H), 7.63 (dd, J = 7.7, 1.3 Hz, 1H), 7.60 (s, 1H), 7.31 (t, J = 7.6 Hz, 1H), 7.27 – 7.23 (m, 4H), 7.23 – 7.19 (m, 1H), 7.14 – 7.10 (m, 2H), 6.94 (s, 1H), 6.73 (d, J = 5.9 Hz, 1H), 6.43 (d, J = 1.5 Hz, 1H), 5.16 (d, J = 7.1 Hz, 1H), 4.97 (q, J = 6.8 Hz, 1H), 4.31 (q, J = 7.0 Hz, 1H), 4.19 (t, J = 6.9 Hz, 1H), 3.97 (dd, J = 16.6, 5.9 Hz, 1H), 3.81 (dd, J = 16.4, 5.3 Hz, 1H), 3.71 (s, 3H), 3.36 – 3.21 (m, 2H), 2.93 (qd, J = 14.5, 13.9, 7.5 Hz, 2H), 2.08 – 1.99 (m, 1H), 1.46 (s, 9H), 1.38 (s, 9H), 0.81 (d, J = 6.8 Hz, 3H), 0.73 (d, J = 6.8 Hz, 3H). **¹³C NMR** (126 MHz, CDCl₃) δ 178.69, 172.00, 171.89, 171.34, 171.10, 170.74, 168.93, 155.85, 150.27, 136.25, 133.64, 131.37, 129.21, 128.66, 127.51, 127.01, 124.74, 123.43, 121.83, 121.18, 117.54, 115.23, 80.69, 58.80, 55.94, 52.58, 52.00, 43.21, 41.26, 37.80, 30.07, 28.38, 28.23, 27.44, 19.16, 17.43. **HRMS** (ESI) m/z calcd for C₄₂H₅₂N₆O₁₀Na (M + Na)⁺ 823.3637, found 823.3636.



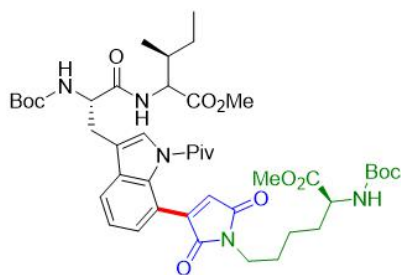
¹H NMR (500 MHz, DMSO) δ 10.84 (s, 1H), 8.48 (d, J = 7.6 Hz, 1H), 8.16 (t, J = 5.8 Hz, 1H), 8.11 (d, J = 7.8 Hz, 1H), 8.08 (d, J = 8.3 Hz, 1H), 7.83 (s, 1H), 7.74 (d, J = 8.2 Hz, 1H), 7.69 (dd, J = 7.0, 2.1 Hz, 1H), 7.38 – 7.33 (m, 2H), 7.27 – 7.22 (m, 5H), 7.18 (ddd, J = 8.7, 4.9, 3.9 Hz, 1H), 6.72 (t, J = 4.8 Hz, 1H), 6.71 (d, J = 1.2 Hz, 1H), 4.65 (td, J = 7.9, 5.6 Hz, 1H), 4.52 (ddd, J = 10.1, 8.3, 4.0 Hz, 1H), 4.28 – 4.22 (m, 1H), 4.19 – 4.14 (m, 1H), 3.74 (t, J = 5.5 Hz, 2H), 3.62 (q, J = 1.6 Hz, 1H), 3.60 (s, 3H), 3.23 (dd, J = 14.9, 5.6 Hz, 1H), 3.11 (dd, J = 15.0, 8.2 Hz, 1H), 2.99 (dd, J = 13.9, 4.0 Hz, 1H), 2.87 (q, J = 6.4, 5.7 Hz, 2H), 2.71 (dd, J = 13.9, 10.2 Hz, 1H), 1.75 (d, J = 4.2 Hz, 1H), 1.74 (s, 3H), 1.73 – 1.60 (m, 2H), 1.46 – 1.44 (m, 2H), 1.39 (s, 9H), 1.36 (s, 9H), 1.23 – 1.16 (m, 1H), 1.12 – 1.04 (m, 1H), 0.84 – 0.80 (m, 6H). **¹³C NMR** (126 MHz, DMSO) δ 178.98, 172.93, 172.28, 172.24, 171.92, 171.89, 171.51, 169.66, 169.20, 155.99, 149.37, 138.50, 133.37, 131.19, 129.58, 128.42, 127.54, 126.62, 125.90, 123.57, 123.17, 121.21, 118.00, 115.65, 99.99, 77.79, 57.41, 54.30, 53.11, 52.44, 41.96, 41.33, 37.91, 37.13, 31.89, 29.71, 28.73, 28.52, 28.25, 26.80, 24.70, 23.22, 22.86, 15.72, 11.54. **HRMS** (ESI) m/z calcd for C₅₁H₆₈N₈O₁₂Na (M + Na)⁺ 1007.4849, found 1007.4842.



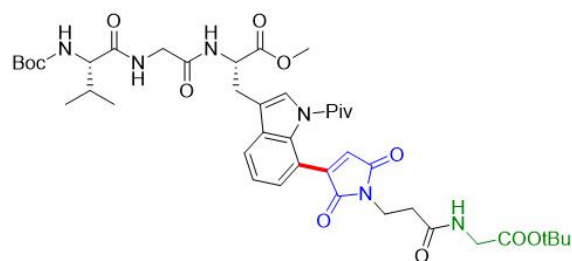
¹H NMR (500 MHz, CDCl₃) δ 8.00 (s, 1H), 7.72 (s, 1H), 7.64 (d, J = 7.5 Hz, 2H), 7.58 (s, 1H), 7.30 (t, J = 7.6 Hz, 1H), 7.25 (dd, J = 7.4, 1.3 Hz, 1H), 6.42 (d, J = 1.5 Hz, 1H), 5.47 (s, 1H), 5.03 (q, J = 7.1 Hz, 1H), 4.60 (s, 1H), 4.34 (s, 1H), 4.26 (d, J = 16.1 Hz, 1H), 4.01 (s, 1H), 3.90 – 3.82 (m, 1H), 3.70 (s, 3H), 3.28 (qd, J = 15.5, 6.6 Hz, 2H), 2.01 (t, J = 7.5 Hz, 3H), 1.67 – 1.57 (m, 2H), 1.50 – 1.48 (m, 1H), 1.43 (s, 9H), 1.42 (s, 9H), 1.21 (d, J = 6.9 Hz, 3H), 0.92 – 0.84 (m, 12H). **¹³C NMR** (126 MHz, CDCl₃) δ 178.60, 172.72, 172.09, 171.92, 171.10, 170.70, 169.32, 156.40, 150.32, 133.59, 131.43, 127.34, 124.62, 123.35, 121.80, 121.23, 117.43, 115.61, 80.36, 60.38, 52.48, 52.14, 51.85, 49.51, 43.06, 41.21, 30.64, 29.67, 28.36, 28.26, 27.44, 24.77, 22.91, 21.79, 19.23, 17.73. **HRMS** (ESI) m/z calcd for C₄₂H₅₉N₇O₁₁Na (M + Na)⁺ 860.4165, found 860.4166.



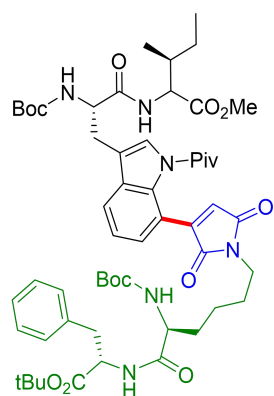
¹H NMR (500 MHz, CDCl₃) δ 7.59 (dd, J = 7.5, 1.5 Hz, 1H), 7.53 (s, 1H), 7.31 (t, J = 7.5 Hz, 1H), 7.27 (dd, J = 7.4, 1.5 Hz, 1H), 6.46 (s, 1H), 6.21 (dd, J = 6.5, 4.2 Hz, 2H), 5.02 (dt, J = 7.9, 5.7 Hz, 1H), 3.91 (d, J = 5.0 Hz, 2H), 3.87 – 3.83 (m, 2H), 3.73 (s, 3H), 3.37 – 3.21 (m, 2H), 2.59 (dd, J = 8.5, 6.6 Hz, 2H), 1.99 (s, 3H), 1.45 (s, 9H), 1.45 (s, 9H). **¹³C NMR** (126 MHz, CDCl₃) δ 178.59, 172.09, 170.93, 170.23, 169.81, 169.78, 168.89, 149.60, 133.53, 131.57, 127.67, 124.72, 123.45, 121.15, 121.11, 117.76, 115.18, 82.27, 52.56, 52.14, 42.02, 41.25, 34.78, 34.12, 29.66, 28.42, 28.17, 28.01, 27.39, 23.15. **HRMS** (ESI) m/z calcd for C₄₂H₄₀N₄O₉Na (M + Na)⁺ 647.2687, found 647.2688.



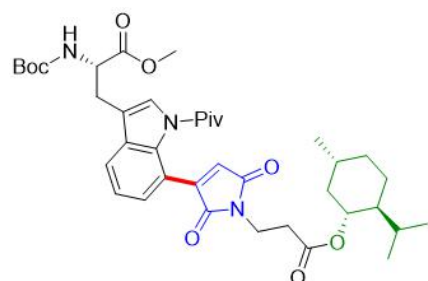
¹H NMR (400 MHz, CDCl₃) δ 7.69 (dd, *J* = 7.6, 1.5 Hz, 1H), 7.62 (s, 1H), 7.33 (t, *J* = 7.5 Hz, 1H), 7.29 (dd, *J* = 7.5, 1.5 Hz, 1H), 6.54 (d, *J* = 8.5 Hz, 1H), 6.46 (s, 1H), 5.19 (d, *J* = 8.3 Hz, 1H), 5.06 (d, *J* = 8.4 Hz, 1H), 4.63 – 4.45 (m, 2H), 4.29 (td, *J* = 7.9, 4.9 Hz, 1H), 3.74 (s, 3H), 3.68 (s, 3H), 3.51 (t, *J* = 7.4 Hz, 2H), 3.23 (d, *J* = 5.8 Hz, 2H), 1.87 – 1.78 (m, 2H), 1.67 – 1.61 (m, 2H), 1.48 – 1.42 (m, 27H), 1.38 – 1.32 (m, 2H), 1.16 – 1.08 (m, 1H), 0.90 – 0.86 (m, 5H), 0.84 (d, *J* = 6.9 Hz, 3H). **¹³C NMR** (101 MHz, CDCl₃) δ 178.51, 173.28, 171.73, 171.35, 170.87, 170.55, 155.60, 155.37, 149.54, 133.62, 131.49, 127.61, 125.13, 123.51, 121.31, 121.01, 117.77, 115.54, 80.52, 79.88, 56.60, 54.01, 53.28, 52.32, 52.19, 41.24, 37.83, 37.44, 32.19, 29.07, 28.46, 28.31, 28.27, 25.03, 22.53, 15.36, 11.58, 11.47. **HRMS** (ESI) *m/z* calcd for C₄₄H₆₃N₅O₁₂Na (M + Na)⁺ 876.4365, found 876.4366.



¹H NMR (500 MHz, CDCl₃) δ 7.59 – 7.57 (m, 1H), 7.30 (t, *J* = 7.6 Hz, 1H), 7.25 (dd, *J* = 7.4, 1.4 Hz, 1H), 7.18 (d, *J* = 7.7 Hz, 1H), 6.97 (q, *J* = 5.5, 4.9 Hz, 1H), 6.44 (s, 1H), 6.38 (t, *J* = 5.2 Hz, 1H), 5.19 (d, *J* = 8.3 Hz, 1H), 4.94 (dt, *J* = 7.8, 6.2 Hz, 1H), 3.90 (t, *J* = 6.7 Hz, 6H), 3.86 – 3.82 (m, 2H), 3.69 (s, 3H), 3.25 (ddd, *J* = 50.6, 15.2, 6.3 Hz, 2H), 2.66 – 2.55 (m, 3H), 1.45 (s, 9H), 1.43 (s, 9H), 1.41 (s, 9H), 0.90 (d, *J* = 6.8 Hz, 3H), 0.86 (d, *J* = 6.7 Hz, 3H). **¹³C NMR** (126 MHz, CDCl₃) δ 178.64, 172.35, 171.74, 170.96, 170.79, 170.28, 169.94, 169.88, 168.99, 168.93, 168.79, 149.57, 133.57, 131.32, 127.61, 124.96, 123.45, 121.09, 121.06, 117.73, 115.14, 82.21, 80.03, 60.02, 52.55, 52.22, 43.03, 42.00, 41.97, 41.24, 35.57, 35.25, 34.73, 34.24, 34.14, 33.56, 33.19, 31.88, 30.75, 30.29, 29.65, 29.61, 29.31, 28.95, 28.40, 28.29, 28.08, 28.02, 28.00, 27.40, 25.39, 22.65, 19.21, 17.68, 14.07. **HRMS** (ESI) *m/z* calcd for C₄₂H₅₈N₆O₁₂Na (M + Na)⁺ 861.4005, found 861.4006.

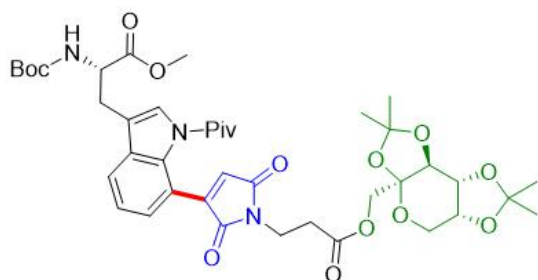


¹H NMR (400 MHz, CDCl₃) δ 7.68 (dd, *J* = 7.5, 1.6 Hz, 1H), 7.62 (s, 1H), 7.34 – 7.19 (m, 6H), 7.17 – 7.12 (m, 2H), 6.58 (dd, *J* = 13.1, 7.9 Hz, 2H), 6.44 (s, 1H), 5.23 (d, *J* = 8.4 Hz, 1H), 5.03 (d, *J* = 8.1 Hz, 1H), 4.69 (q, *J* = 6.5 Hz, 1H), 4.52 (td, *J* = 10.2, 8.5, 5.4 Hz, 2H), 4.05 (q, *J* = 7.1, 6.4 Hz, 1H), 3.68 (s, 3H), 3.48 (q, *J* = 6.5, 5.8 Hz, 2H), 3.21 (t, *J* = 6.3 Hz, 2H), 3.05 (h, *J* = 6.9, 6.1 Hz, 2H), 1.88 – 1.78 (m, 2H), 1.66 – 1.54 (m, 4H), 1.43 (d, *J* = 6.8 Hz, 27H), 1.39 (s, 9H), 0.90 – 0.82 (m, 6H). **¹³C NMR** (101 MHz, CDCl₃) δ 178.52, 171.75, 171.49, 171.41, 170.93, 170.56, 170.26, 155.57, 149.52, 136.12, 133.61, 131.49, 129.54, 128.36, 127.59, 126.94, 125.10, 123.48, 121.29, 120.99, 117.79, 115.56, 82.30, 80.47, 79.98, 56.60, 54.49, 54.00, 53.66, 53.48, 52.18, 41.23, 38.02, 37.81, 37.31, 31.90, 28.45, 28.29, 27.93, 25.02, 22.65, 15.36, 11.57. **HRMS** (ESI) *m/z* calcd for C₅₆H₇₈N₆O₁₃Na (M + Na)⁺ 1065.5519, found 1065.5517.

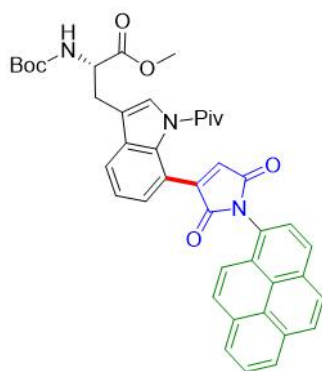


¹H NMR (500 MHz, CDCl₃) δ 7.61 (d, *J* = 7.6 Hz, 1H), 7.55 (s, 1H), 7.31 (t, *J* = 7.5 Hz, 1H), 7.27 (dd, *J* = 7.6, 1.3 Hz,

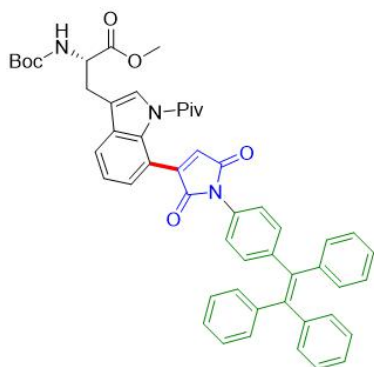
1H), 6.47 (s, 1H), 5.19 (d, $J = 8.2$ Hz, 1H), 4.70 (ddt, $J = 15.3, 10.9, 5.6$ Hz, 2H), 3.82 (t, $J = 7.7$ Hz, 2H), 3.71 (s, 3H), 3.25 (ddd, $J = 50.3, 15.1, 5.8$ Hz, 2H), 2.72 – 2.60 (m, 2H), 2.01 – 1.94 (m, 1H), 1.82 (pt, $J = 7.2, 3.6$ Hz, 1H), 1.66 (dp, $J = 13.1, 3.1$ Hz, 2H), 1.46 (s, 9H), 1.44 (s, 9H), 1.39 – 1.32 (m, 2H), 1.29 (s, 1H), 1.04 (qd, $J = 13.5, 12.7, 3.8$ Hz, 1H), 0.99 – 0.91 (m, 1H), 0.88 (t, $J = 6.5$ Hz, 6H), 0.74 (d, $J = 7.0$ Hz, 3H). **^{13}C NMR** (126 MHz, CDCl_3) δ 178.48, 172.22, 170.78, 170.27, 170.17, 155.07, 149.65, 133.55, 131.57, 127.55, 124.78, 123.38, 121.05, 117.69, 115.22, 80.14, 74.64, 53.29, 52.44, 46.90, 41.22, 40.79, 34.19, 33.56, 33.25, 31.34, 29.66, 28.46, 28.31, 26.28, 23.46, 21.96, 20.72, 16.37, 14.09. **HRMS** (ESI) m/z calcd for $\text{C}_{39}\text{H}_{53}\text{N}_3\text{O}_9\text{Na}$ ($M + \text{Na}$) $^+$ 730.3674, found 730.3678.



^1H NMR (500 MHz, CDCl_3) δ 7.62 – 7.58 (m, 1H), 7.54 (s, 1H), 7.30 (t, $J = 7.5$ Hz, 1H), 7.28 – 7.25 (m, 1H), 6.46 (s, 1H), 5.18 (d, $J = 8.2$ Hz, 1H), 4.71 (q, $J = 6.4$ Hz, 1H), 4.59 (dd, $J = 7.9, 2.6$ Hz, 1H), 4.41 (d, $J = 11.7$ Hz, 1H), 4.30 (d, $J = 2.6$ Hz, 1H), 4.22 (dd, $J = 8.0, 1.6$ Hz, 1H), 4.04 (d, $J = 11.7$ Hz, 1H), 3.89 (dd, $J = 13.0, 2.0$ Hz, 1H), 3.86 – 3.82 (m, 2H), 3.74 (d, $J = 13.0$ Hz, 1H), 3.70 (s, 3H), 3.24 (ddd, $J = 52.8, 15.0, 5.8$ Hz, 2H), 2.73 – 2.69 (m, 2H), 1.52 (s, 3H), 1.46 (s, 3H), 1.44 (s, 9H), 1.43 (s, 9H), 1.37 (s, 3H), 1.32 (s, 3H). **^{13}C NMR** (126 MHz, CDCl_3) δ 178.44, 172.17, 170.66, 170.07, 169.96, 155.03, 149.67, 134.15, 133.50, 131.54, 127.54, 124.71, 123.37, 121.00, 117.62, 115.26, 109.08, 108.66, 101.39, 80.10, 70.69, 70.44, 70.01, 65.29, 61.21, 53.24, 52.40, 41.18, 33.31, 32.78, 29.61, 28.42, 28.27, 26.39, 25.83, 25.18, 24.01, 14.04. **HRMS** (ESI) m/z calcd for $\text{C}_{41}\text{H}_{53}\text{N}_3\text{O}_{14}\text{Na}$ ($M + \text{Na}$) $^+$ 834.3420, found 834.3426.

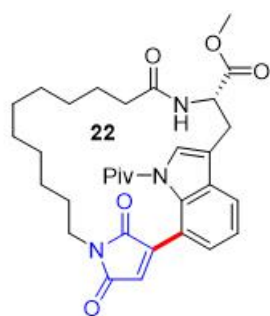


^1H NMR (500 MHz, CDCl_3) δ 8.28 – 8.21 (m, 3H), 8.16 – 8.10 (m, 3H), 8.08 (dd, $J = 9.4, 2.7$ Hz, 1H), 8.05 (t, $J = 7.6$ Hz, 1H), 7.91 (dd, $J = 8.0, 1.5$ Hz, 1H), 7.68 (d, $J = 7.8$ Hz, 1H), 7.57 (s, 1H), 7.51 (dd, $J = 7.4, 1.2$ Hz, 1H), 7.43 (t, $J = 7.7$ Hz, 1H), 6.82 (s, 1H), 5.18 (d, $J = 8.2$ Hz, 1H), 4.75 (q, $J = 6.4$ Hz, 1H), 3.71 (s, 3H), 3.28 (ddd, $J = 48.1, 14.9, 4.7$ Hz, 2H), 1.45 (s, 9H), 1.37 (s, 9H). **^{13}C NMR** (126 MHz, CDCl_3) δ 178.67, 172.23, 170.90, 170.18, 150.34, 133.68, 131.92, 130.99, 130.85, 128.96, 128.69, 128.35, 127.84, 127.08, 126.58, 126.29, 125.79, 125.73, 125.35, 125.21, 125.02, 124.40, 123.57, 122.24, 121.44, 121.30, 117.80, 115.35, 80.19, 53.33, 52.47, 41.26, 31.92, 29.70, 28.79, 28.53, 28.32, 22.69, 14.11. **HRMS** (ESI) m/z calcd for $\text{C}_{42}\text{H}_{39}\text{N}_3\text{O}_7\text{Na}$ ($M + \text{Na}$) $^+$ 720.2683, found 720.2685.



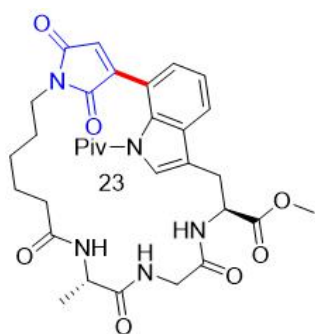
^1H NMR (400 MHz, CDCl_3) δ 7.65 (p, $J = 3.8$ Hz, 1H), 7.58 (s, 1H), 7.36 (q, $J = 3.8, 2.8$ Hz, 2H), 7.18 – 7.11 (m, 13H), 7.07 (ddt, $J = 8.0, 5.2, 2.7$ Hz, 6H), 6.61 (s, 1H), 5.19 (d, $J = 8.2$ Hz, 1H), 4.84 – 4.68 (m, 1H), 3.74 (s, 3H), 3.41 – 3.18 (m, 2H), 1.45 (d, $J = 23.8$ Hz, 18H). **^{13}C NMR** (101 MHz, CDCl_3) δ 178.68, 172.30, 170.16, 169.26, 155.12, 149.51, 143.56, 143.40, 143.37, 143.00, 141.64, 140.12, 133.66, 131.85, 131.62, 131.44, 131.37, 131.34,

129.96, 127.78, 127.75, 127.69, 127.64, 126.63, 126.59, 126.56, 125.38, 125.28, 124.81, 123.50, 121.43, 121.01, 117.62, 115.26, 80.23, 53.31, 52.56, 41.24, 28.48, 28.37, 27.73. **HRMS** (ESI) m/z calcd for $C_{52}H_{49}N_3O_7Na$ ($M + Na$)⁺ 827.3571, found 827.3573.

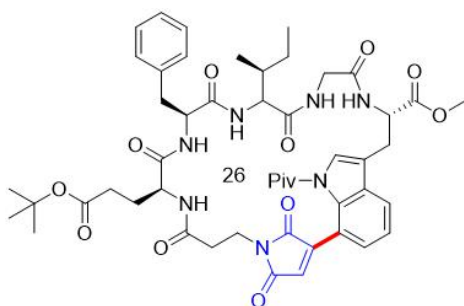


Chemical Formula: $C_{32}H_{41}N_3O_6$
Exact Mass: 563.2995

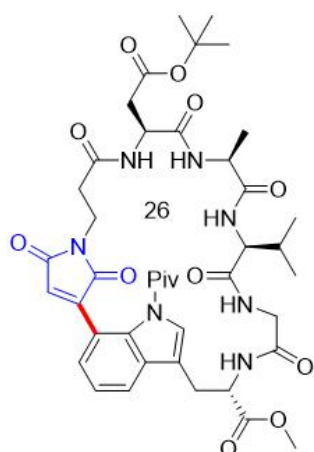
28.63, 28.25, 27.50, 26.69, 25.58, 24.99. **HRMS** (ESI) m/z calcd for $C_{32}H_{41}N_3O_6Na$ ($M + Na$)⁺ 586.2888, found 586.2893.



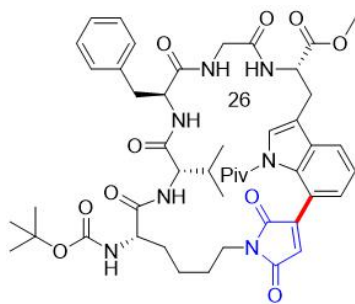
¹H NMR (500 MHz, $CDCl_3$) δ 7.63 (dd, $J = 7.8, 1.3$ Hz, 1H), 7.59 (s, 1H), 7.33 (t, $J = 7.7$ Hz, 1H), 7.28 (d, $J = 1.3$ Hz, 1H), 7.27 (d, $J = 1.2$ Hz, 0H), 6.91 (d, $J = 7.1$ Hz, 1H), 6.74 (d, $J = 6.1$ Hz, 1H), 6.44 (s, 1H), 6.34 (d, $J = 8.3$ Hz, 1H), 4.89 (ddd, $J = 8.7, 7.1, 4.7$ Hz, 1H), 4.32 (dd, $J = 8.1, 7.0$ Hz, 1H), 3.97 (dd, $J = 15.6, 6.0$ Hz, 1H), 3.87 (s, 3H), 3.75 – 3.62 (m, 2H), 3.56 – 3.47 (m, 2H), 3.41 (dd, $J = 14.8, 4.7$ Hz, 1H), 3.10 (dd, $J = 14.9, 8.6$ Hz, 1H), 2.24 (ddd, $J = 13.5, 7.3, 5.8$ Hz, 1H), 2.17 – 2.07 (m, 1H), 1.87 – 1.78 (m, 1H), 1.67 (tt, $J = 13.5, 6.3$ Hz, 2H), 1.48 (s, 9H), 1.32 (ddd, $J = 9.1, 6.9, 3.0$ Hz, 2H), 0.46 (d, $J = 7.1$ Hz, 3H). **¹³C NMR** (126 MHz, $CDCl_3$) δ 178.63, 173.37, 172.27, 172.11, 171.30, 171.07, 169.31, 147.81, 133.99, 130.82, 127.46, 125.56, 123.47, 121.34, 120.67, 117.88, 114.22, 52.76, 51.47, 47.92, 43.50, 41.34, 36.71, 29.68, 28.58, 28.31, 27.20, 25.18, 24.16, 18.32. **HRMS** (ESI) m/z calcd for $C_{32}H_{39}N_5O_8Na$ ($M + Na$)⁺ 644.2691, found 644.2694.



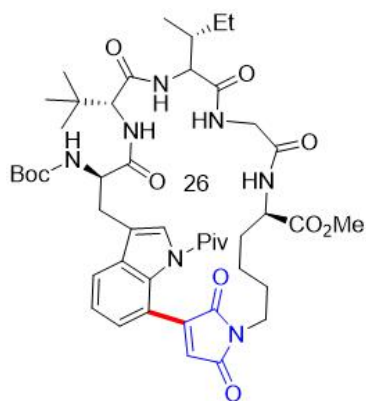
¹H NMR (500 MHz, DMSO) δ 8.53 (d, $J = 8.4$ Hz, 1H), 7.98 (s, 1H), 7.89 (s, 1H), 7.69 (t, $J = 26.4$ Hz, 2H), 7.44 – 7.22 (m, 4H), 7.09 (s, 4H), 6.81 (d, $J = 37.3$ Hz, 3H), 4.51 (d, $J = 74.3$ Hz, 2H), 4.06 (t, $J = 7.2$ Hz, 1H), 3.74 (s, 9H), 3.29 (d, $J = 14.0$ Hz, 1H), 2.93 (t, $J = 13.4$ Hz, 1H), 2.78 (d, $J = 15.6$ Hz, 1H), 2.36 (d, $J = 37.1$ Hz, 3H), 1.94 – 1.78 (m, 2H), 1.73 – 1.60 (m, 2H), 1.47 (s, 1H), 1.38 (d, $J = 3.0$ Hz, 18H), 0.74 (d, $J = 18.6$ Hz, 6H). **¹³C NMR** (126 MHz, DMSO) δ 171.88, 171.39, 170.84, 170.77, 170.74, 170.45, 170.43, 170.30, 170.28, 170.27, 170.11, 168.31, 168.28, 167.40, 137.86, 137.52, 132.74, 130.38, 128.75, 127.70, 127.14, 125.80, 123.01, 120.69, 117.35, 79.56, 57.30, 53.54, 52.25, 41.43, 40.93, 36.44, 34.51, 30.90, 28.98, 28.04, 27.95, 27.72, 26.59, 26.24, 24.17, 15.36, 11.38, 11.26. **HRMS** (ESI) m/z calcd for $C_{50}H_{63}N_7O_{12}Na$ ($M + Na$)⁺ 976.4427, found 976.4429.



¹H NMR (500 MHz, CDCl₃) δ 7.68 (d, *J* = 7.8 Hz, 1H), 7.37 (t, *J* = 7.7 Hz, 1H), 7.29 (s, 1H), 7.12 (d, *J* = 7.2 Hz, 2H), 7.03 (d, *J* = 8.5 Hz, 1H), 6.70 (d, *J* = 9.1 Hz, 1H), 6.54 (d, *J* = 6.4 Hz, 2H), 6.31 (s, 1H), 5.22 (ddd, *J* = 12.2, 8.5, 3.9 Hz, 1H), 4.73 (ddd, *J* = 12.0, 9.2, 3.3 Hz, 1H), 4.43 (dd, *J* = 17.2, 8.3 Hz, 1H), 3.95 (dq, *J* = 14.7, 9.5, 5.5 Hz, 2H), 3.82 (d, *J* = 9.2 Hz, 4H), 3.46 – 3.32 (m, 2H), 3.28 (dd, *J* = 17.2, 4.5 Hz, 1H), 2.75 (dd, *J* = 16.9, 11.2 Hz, 1H), 2.56 (dd, *J* = 13.6, 6.6 Hz, 1H), 2.40 (dd, *J* = 16.9, 3.3 Hz, 1H), 2.35 – 2.28 (m, 1H), 2.14 (h, *J* = 6.8 Hz, 1H), 1.84 – 1.76 (m, 1H), 1.38 (s, 9H), 1.33 (s, 9H), 0.92 (dd, *J* = 9.4, 6.8 Hz, 6H), 0.64 (d, *J* = 7.3 Hz, 3H). **¹³C NMR** (126 MHz, CDCl₃) δ 179.04, 173.65, 171.70, 171.28, 170.99, 170.45, 170.06, 147.86, 133.35, 131.92, 126.08, 123.95, 123.36, 122.79, 120.91, 117.69, 116.36, 81.68, 60.63, 52.74, 51.59, 49.81, 48.32, 42.72, 41.41, 38.19, 36.61, 34.53, 29.64, 28.64, 28.59, 27.83, 26.11, 19.41, 19.31, 16.05, 9.45. **HRMS** (ESI) *m/z* calcd for C₄₂H₃₅N₇O₁₂Na (M + Na)⁺ 872.3801, found 872.3803.

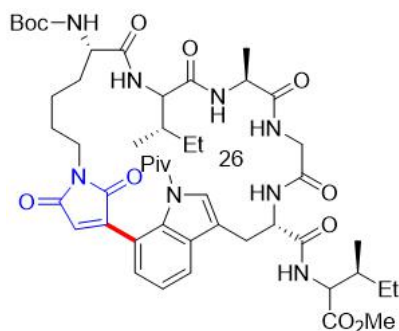


¹H NMR (500 MHz, CDCl₃) δ 7.81 (s, 1H), 7.62 (d, *J* = 7.7 Hz, 1H), 7.45 (s, 1H), 7.39 (d, *J* = 6.1 Hz, 1H), 7.29 (d, *J* = 8.2 Hz, 2H), 7.24 (d, *J* = 7.6 Hz, 1H), 7.20 – 7.08 (m, 6H), 6.49 (s, 1H), 5.87 (s, 1H), 5.32 (d, *J* = 11.3 Hz, 1H), 4.91 (s, 1H), 4.61 (s, 1H), 4.50 (dd, *J* = 17.6, 7.4 Hz, 1H), 3.95 (d, *J* = 5.5 Hz, 1H), 3.82 (s, 3H), 3.68 (dd, *J* = 17.6, 8.6 Hz, 1H), 3.56 (dd, *J* = 17.4, 4.9 Hz, 1H), 3.42 (dq, *J* = 27.8, 15.9, 15.4 Hz, 5H), 3.05 – 2.97 (m, 1H), 2.51 (s, 1H), 2.30 (t, *J* = 13.8 Hz, 1H), 2.14 – 1.98 (m, 2H), 1.79 – 1.68 (m, 1H), 1.58 (s, 1H), 1.42 (s, 9H), 1.15 (s, 9H), 0.43 (d, *J* = 6.9 Hz, 3H), 0.21 (d, *J* = 6.9 Hz, 3H). **¹³C NMR** (126 MHz, CDCl₃) δ 178.51, 172.68, 171.87, 171.81, 171.04, 169.88, 156.72, 137.45, 133.96, 131.72, 129.45, 128.27, 127.92, 127.01, 126.35, 123.07, 121.06, 118.98, 117.40, 115.98, 81.31, 59.52, 56.33, 54.93, 52.71, 49.68, 48.00, 43.24, 41.03, 35.24, 34.91, 29.65, 28.94, 28.69, 28.59, 28.44, 27.83, 26.23, 19.52, 19.30, 16.57. **HRMS** (ESI) *m/z* calcd for C₄₈H₆₁N₇O₁₁Na (M + Na)⁺ 934.4321, found 934.4328.

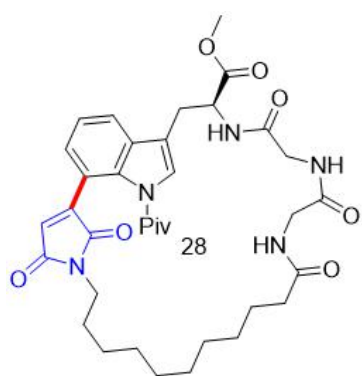


¹H NMR (600 MHz, CDCl₃) δ 7.77 (s, 1H), 7.60 – 7.34 (m, 2H), 7.27 (d, *J* = 5.2 Hz, 1H), 7.09 – 6.49 (m, 3H), 6.10 (t, *J* = 31.0 Hz, 2H), 5.63 (s, 1H), 5.03 (s, 1H), 4.80 (s, 1H), 4.47 (d, *J* = 34.4 Hz, 2H), 3.75 (s, 3H), 3.70 – 3.45 (m, 3H), 3.37 – 3.15 (m, 2H), 3.12 – 2.77 (m, 2H), 1.94 (dt, *J* = 11.8, 6.0 Hz, 2H), 1.69 – 1.60 (m, 2H), 1.50 (d, *J* = 15.4 Hz, 18H), 1.42 (d, *J* = 16.1 Hz, 2H), 1.30 – 1.19 (m, 2H), 1.02 (s, 3H), 0.90 (qd, *J* = 6.1, 3.5, 2.7 Hz, 3H), 0.80 (s, 9H). **¹³C NMR** (151 MHz, CDCl₃) δ 172.29, 171.56, 170.66, 170.14, 168.83, 162.02, 155.25, 148.98, 145.86, 140.76, 137.32, 134.22, 132.13, 126.97, 125.39, 125.34, 123.38, 117.00, 112.77, 80.32, 60.20, 59.61, 56.08, 52.47, 51.38, 42.50, 41.35, 36.94, 35.97, 34.99, 31.14, 28.69, 28.62, 28.38,

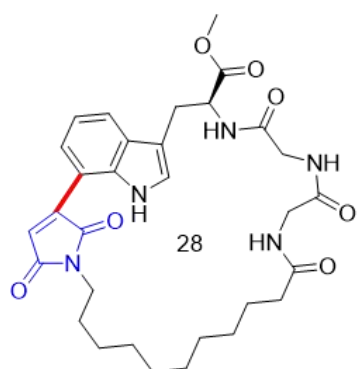
27.77, 26.30, 22.67, 21.12, 14.84, 11.71. **HRMS** (ESI) m/z calcd for $C_{46}H_{65}N_7O_{11}Na$ ($M + Na$)⁺ 914.4634, found 914.4668.



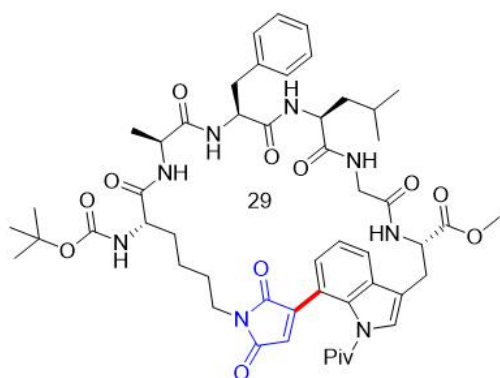
¹H NMR (400 MHz, DMSO) δ 8.62 (s, 1H), 8.25 – 7.71 (m, 5H), 7.71 – 7.41 (m, 3H), 7.38 (d, J = 6.4 Hz, 2H), 7.34 – 7.13 (m, 1H), 6.97 (d, J = 32.2 Hz, 1H), 6.85 (s, 1H), 4.72 (s, 1H), 4.30 (q, J = 6.8 Hz, 1H), 4.22 – 4.01 (m, 2H), 3.88 (d, J = 15.9 Hz, 2H), 3.68 (s, 4H), 3.49 – 3.44 (m, 1H), 3.19 – 3.07 (m, 1H), 2.95 – 2.79 (m, 1H), 1.88 (p, J = 7.0, 6.3 Hz, 2H), 1.54 (d, J = 4.1 Hz, 2H), 1.45 (s, 2H), 1.37 (d, J = 5.4 Hz, 18H), 1.22 (d, J = 9.1 Hz, 3H), 1.12 (t, J = 7.2 Hz, 2H), 0.93 – 0.87 (m, 6H), 0.83 (d, J = 13.2 Hz, 9H). **¹³C NMR** (101 MHz, DMSO) δ 178.80, 172.58, 172.43, 172.34, 172.07, 170.49, 168.52, 155.95, 148.62, 133.58, 127.49, 123.32, 121.91, 121.09, 119.13, 118.04, 116.30, 112.60, 78.55, 68.12, 60.66, 57.11, 54.44, 52.23, 48.81, 42.06, 41.53, 41.22, 36.61, 34.36, 29.48, 28.80, 28.61, 28.33, 27.10, 26.97, 25.37, 21.97, 18.28, 15.95, 11.72, 11.66, 9.05, 8.19. **HRMS** (ESI) m/z calcd for $C_{49}H_{70}N_8O_{12}Na$ ($M + Na$)⁺ 985.5005, found 985.5007.



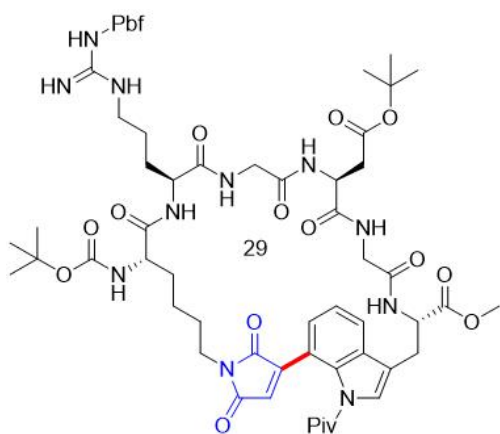
¹H NMR (500 MHz, CDCl₃) δ 7.59 (s, 1H), 7.55 (dd, J = 7.8, 1.3 Hz, 1H), 7.33 (t, J = 7.6 Hz, 1H), 7.26 (dd, J = 7.4, 1.3 Hz, 1H), 7.08 (d, J = 8.3 Hz, 1H), 7.01 (t, J = 5.9 Hz, 1H), 6.44 (s, 1H), 6.43 (d, J = 5.4 Hz, 1H), 5.04 (td, J = 8.0, 4.3 Hz, 1H), 3.89 (dd, J = 16.3, 5.9 Hz, 1H), 3.82 – 3.77 (m, 4H), 3.54 (t, J = 6.8 Hz, 4H), 3.36 (dd, J = 15.7, 4.0 Hz, 1H), 3.19 (dd, J = 15.6, 7.8 Hz, 1H), 2.05 (t, J = 7.6 Hz, 2H), 1.70 – 1.60 (m, 2H), 1.53 (d, J = 8.0 Hz, 3H), 1.45 (s, 9H), 1.34 (t, J = 3.3 Hz, 5H), 1.30 – 1.26 (m, 6H). **¹³C NMR** (126 MHz, CDCl₃) δ 178.49, 174.37, 171.83, 171.19, 169.84, 169.06, 149.07, 133.55, 131.49, 127.40, 125.00, 123.62, 121.51, 120.97, 117.81, 115.02, 52.73, 51.36, 43.27, 42.90, 41.22, 37.76, 35.74, 31.42, 29.66, 28.98, 28.50, 28.24, 27.91, 27.71, 27.53, 26.98, 25.42, 24.94. **HRMS** (ESI) m/z calcd for $C_{36}H_{47}N_5O_8Na$ ($M + Na$)⁺ 700.3317, found 700.3317.



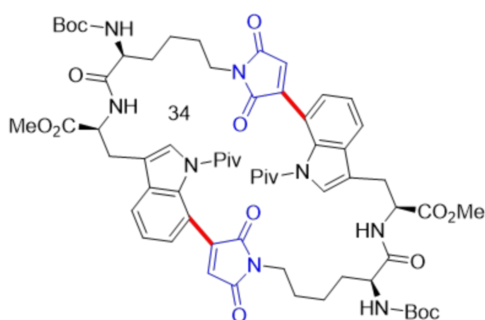
¹H NMR (400 MHz, DMSO) δ 10.99 (d, J = 2.6 Hz, 1H), 8.14 (d, J = 8.2 Hz, 1H), 8.06 (t, J = 6.0 Hz, 1H), 7.93 (t, J = 5.8 Hz, 1H), 7.78 – 7.63 (m, 2H), 7.30 (d, J = 2.5 Hz, 1H), 7.22 (s, 1H), 7.16 (t, J = 7.7 Hz, 1H), 4.57 (ddd, J = 11.1, 8.2, 3.1 Hz, 1H), 3.71 (s, 3H), 3.68 – 3.61 (m, 4H), 3.58 – 3.54 (m, 2H), 3.26 (dd, J = 14.9, 3.0 Hz, 1H), 3.06 (dd, J = 14.8, 10.6 Hz, 1H), 2.04 (td, J = 7.3, 4.1 Hz, 2H), 1.63 – 1.54 (m, 2H), 1.45 – 1.34 (m, 3H), 1.29 – 1.16 (m, 11H). **¹³C NMR** (101 MHz, DMSO) δ 173.22, 172.61, 171.49, 171.31, 169.87, 169.34, 141.40, 133.86, 128.73, 125.76, 125.60, 123.89, 121.94, 119.22, 113.32, 110.94, 52.79, 52.63, 42.27, 42.08, 37.83, 35.50, 29.47, 28.98, 28.80, 28.63, 28.48, 27.95, 26.82, 26.17, 25.03. **HRMS** (ESI) m/z calcd for $C_{31}H_{39}N_5O_7Na$ ($M + Na$)⁺ 616.2742, found 616.2741.



¹H NMR (500 MHz, DMSO) δ 8.50 (d, J = 8.4 Hz, 1H), 8.01 (d, J = 8.0 Hz, 1H), 7.90 (s, 1H), 7.80 – 7.66 (m, 3H), 7.58 – 7.49 (m, 1H), 7.41 – 7.35 (m, 2H), 7.21 – 7.10 (m, 6H), 6.94 (d, J = 7.8 Hz, 1H), 6.84 (s, 1H), 4.63 (t, J = 10.6 Hz, 1H), 4.43 (td, J = 8.4, 5.2 Hz, 1H), 4.29 (td, J = 9.2, 4.6 Hz, 1H), 4.15 (t, J = 7.3 Hz, 1H), 3.83 – 3.58 (m, 7H), 3.35 (d, J = 7.3 Hz, 1H), 3.33 – 3.27 (m, 1H), 3.07 (dd, J = 14.2, 5.1 Hz, 1H), 2.99 (dd, J = 14.9, 11.9 Hz, 1H), 2.76 (dd, J = 14.3, 8.9 Hz, 1H), 1.61 – 1.44 (m, 8H), 1.37 (s, 9H), 1.36 (s, 9H), 1.11 (d, J = 7.0 Hz, 3H), 0.83 (d, J = 6.5 Hz, 6H). **¹³C NMR** (126 MHz, DMSO) δ 178.71, 172.63, 172.42, 172.21, 171.94, 171.43, 170.67, 170.56, 168.93, 155.72, 148.77, 137.93, 133.38, 131.04, 129.51, 128.45, 127.81, 126.63, 126.26, 123.68, 121.56, 121.20, 118.06, 115.65, 78.50, 54.98, 53.95, 52.73, 51.80, 51.05, 48.59, 41.90, 41.19, 37.52, 37.06, 32.16, 28.63, 28.52, 28.38, 26.65, 24.46, 23.49, 22.81, 22.10, 18.66. **HRMS** (ESI) m/z calcd for C₅₂H₆₈N₈O₁₂Na (M + Na)⁺ 1019.4849, found 1019.4853.

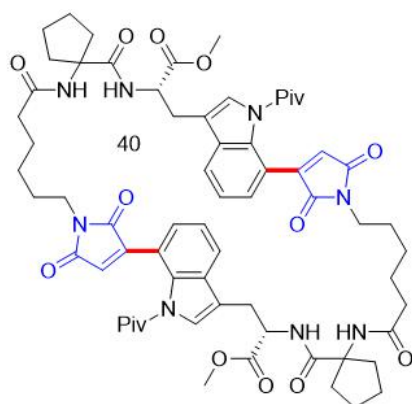


¹H NMR (500 MHz, DMSO) δ 8.56 (d, J = 8.1 Hz, 1H), 8.30 (d, J = 8.2 Hz, 1H), 8.04 (s, 1H), 7.92 (d, J = 8.3 Hz, 2H), 7.82 (d, J = 8.5 Hz, 1H), 7.76 – 7.71 (m, 1H), 7.41 – 7.35 (m, 2H), 7.31 (ddd, J = 9.0, 7.3, 3.6 Hz, 1H), 6.86 (d, J = 6.6 Hz, 2H), 6.62 (s, 1H), 6.40 (d, J = 32.5 Hz, 2H), 4.66 – 4.57 (m, 2H), 4.45 (d, J = 7.1 Hz, 1H), 4.09 (d, J = 18.1 Hz, 1H), 3.96 (dd, J = 16.9, 6.7 Hz, 1H), 3.91 – 3.82 (m, 1H), 3.76 (s, 3H), 3.71 (d, J = 3.4 Hz, 1H), 3.61 (s, 1H), 3.45 (dd, J = 17.5, 3.5 Hz, 2H), 3.28 (d, J = 14.4 Hz, 2H), 3.01 (t, J = 10.2 Hz, 3H), 2.96 (s, 2H), 2.70 (dd, J = 16.0, 5.0 Hz, 1H), 2.47 (s, 3H), 2.42 (s, 3H), 2.40 – 2.35 (m, 1H), 2.01 (s, 3H), 1.64 – 1.44 (m, 8H), 1.41 (s, 6H), 1.36 (t, J = 2.9 Hz, 27H). **¹³C NMR** (126 MHz, DMSO) δ 178.86, 172.45, 172.27, 171.72, 171.52, 170.77, 170.75, 169.75, 169.00, 168.82, 157.88, 156.46, 155.96, 148.80, 137.72, 134.86, 134.67, 133.39, 131.87, 130.89, 129.49, 127.81, 125.35, 124.73, 123.74, 121.55, 121.12, 118.82, 118.07, 116.69, 86.72, 80.63, 78.40, 54.20, 52.77, 52.49, 51.72, 50.03, 42.95, 42.26, 41.95, 41.27, 41.23, 38.17, 37.24, 31.66, 28.76, 28.62, 28.52, 28.28, 28.12, 28.09, 26.67, 22.77, 19.40, 18.04, 12.73. **HRMS** (ESI) m/z calcd for C₆₃H₈₇N₁₁O₁₇Na (M + Na)⁺ 1324.5894, found 1324.5931.



¹H NMR (500 MHz, CDCl₃) δ 7.60 (s, 2H), 7.57 (d, J = 7.7 Hz, 2H), 7.28 – 7.23 (m, 2H), 7.19 (d, J = 7.4 Hz, 2H), 6.80 (d, J = 8.1 Hz, 2H), 6.39 (s, 2H), 4.99 (t, J = 8.7 Hz, 2H), 4.89 (s, 2H), 3.95 (s, 2H), 3.87 – 3.54 (m, 8H), 3.45 (d, J = 17.5 Hz, 4H), 3.27 (d, J = 14.5 Hz, 4H), 2.07 – 1.81 (m, 4H), 1.72 (q, J = 9.5, 8.0 Hz, 2H), 1.62 – 1.51 (m, 4H), 1.40 (d, J = 1.4 Hz, 36H). **¹³C NMR** (126 MHz, CDCl₃) δ 178.40, 172.04, 171.60,

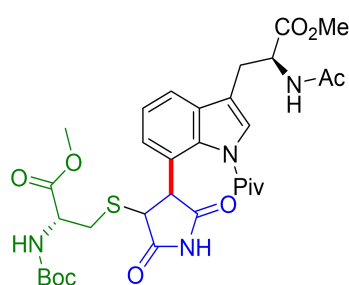
171.25, 170.72, 149.18, 133.56, 131.51, 127.44, 125.03, 123.45, 121.08, 117.81, 114.87, 80.19, 52.49, 51.93, 41.19, 37.07, 31.49, 29.66, 28.59, 28.36, 28.19, 27.82, 27.18, 22.47, 14.06. **HRMS** (ESI) m/z calcd for $C_{64}H_{80}N_8O_{16}Na$ ($M + Na$)⁺ 1239.5584, found 1239.5589.



¹H NMR (500 MHz, $CDCl_3$) δ 7.75 (d, $J = 7.8$ Hz, 2H), 7.69 (s, 2H), 7.60 (dd, $J = 7.7, 1.4$ Hz, 2H), 7.30 (t, $J = 7.5$ Hz, 2H), 7.26 (dd, $J = 7.4, 1.4$ Hz, 2H), 6.42 (s, 2H), 5.66 (s, 2H), 5.00 (td, $J = 7.4, 5.0$ Hz, 2H), 3.72 (s, 6H), 3.37 (t, $J = 7.3$ Hz, 4H), 3.33 – 3.21 (m, 4H), 2.35 – 2.20 (m, 4H), 2.06 (dt, $J = 13.5, 6.4$ Hz, 2H), 1.98 – 1.85 (m, 5H), 1.73 – 1.61 (m, 14H), 1.53 – 1.45 (m, 4H), 1.40 (s, 18H), 1.20 (q, $J = 7.6$ Hz, 4H).

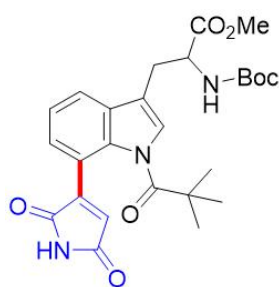
¹³C NMR (126 MHz, $CDCl_3$) δ 178.57, 173.76, 173.72, 172.07, 171.35, 170.51, 149.40, 133.62, 131.63, 127.35, 124.96, 123.29, 121.17, 120.88, 117.79, 115.22, 67.63, 52.46,

51.76, 41.16, 37.41, 36.81, 36.46, 36.11, 29.68, 28.34, 28.03, 27.27, 26.16, 24.85, 23.87, 23.50. **HRMS** (ESI) m/z calcd for $C_{66}H_{80}N_8O_{14}Na$ ($M + Na$)⁺ 1231.5686, found 1231.5689.



¹H NMR (500 MHz, $CDCl_3$) δ 9.54 – 8.78 (m, 1H), 7.56 – 7.42 (m, 2H), 7.38 – 7.24 (m, 2H), 6.38 (s, 1H), 5.69 (d, $J = 226.6$ Hz, 1H), 5.15 – 4.22 (m, 3H), 3.89 (t, $J = 10.8$ Hz, 1H), 3.75 – 3.68 (m, 5H), 3.56 (s, 2H), 3.43 – 3.06 (m, 5H), 1.96 (d, $J = 8.7$ Hz, 3H), 1.38 (d, $J = 29.9$ Hz, 18H). **¹³C NMR** (126 MHz, $CDCl_3$) δ 179.13, 172.21, 171.08, 170.07, 163.30, 155.20, 132.54, 131.47, 124.31, 123.73, 119.09, 80.11, 53.53, 53.43, 52.60, 52.56, 52.41, 52.08, 41.26, 29.64,

29.13, 28.51, 28.33, 28.25, 28.17, 27.26, 27.12, 23.03. **HRMS** (ESI) m/z calcd for $C_{32}H_{42}N_4O_{10}Na$ ($M + Na$)⁺ 674.2622, found 674.2628.



¹H NMR (500 MHz, DMSO) δ 10.98 – 10.68 (m, 1H), 7.87 (s, 1H), 7.71 (dd, $J = 6.7, 2.4$ Hz, 1H), 7.45 (d, $J = 8.1$ Hz, 1H), 7.40 – 7.23 (m, 2H), 6.72 (d, $J = 1.5$ Hz, 1H), 4.35 (ddd, $J = 10.2, 8.1, 4.6$ Hz, 1H), 3.66 (s, 3H), 3.30 – 2.90 (m, 2H), 1.41 (s, 9H), 1.33 (s, 9H). **¹³C NMR** (126 MHz, DMSO) δ 178.89, 172.98, 172.93, 172.27, 155.84, 149.37, 133.33, 131.21, 127.48, 125.95, 123.55, 123.11, 121.20, 118.01, 116.05, 78.79, 55.33, 53.73, 52.40, 41.37, 28.57, 28.25, 26.37. **HRMS** (ESI) m/z calcd for $C_{26}H_{31}N_3O_7Na$ ($M + Na$)⁺ 520.2054, found 520.2053.

M. X-ray Data of 9a

Table S1 Crystal data and structure refinement for 9a.

Identification code	mo_211028_YSC1021_0m
Empirical formula	C ₃₄ H ₄₆ N ₃ O ₇ S
Formula weight	640.80
Temperature/K	170.0
Crystal system	orthorhombic
Space group	P2 ₁ 2 ₁ 2 ₁
a/Å	9.3763(4)
b/Å	16.2241(7)
c/Å	23.2477(10)
α /°	90
β /°	90
γ /°	90
Volume/Å ³	3536.5(3)
Z	4
ρ_{calc} /g/cm ³	1.204
μ /mm ⁻¹	0.140
F(000)	1372.0
Crystal size/mm ³	0.32 × 0.07 × 0.05
Radiation	MoK α (λ = 0.71073)
2 Θ range for data collection/°	4.684 to 54.236
Index ranges	-12 ≤ h ≤ 10, -20 ≤ k ≤ 20, -29 ≤ l ≤ 29
Reflections collected	35967
Independent reflections	7794 [R_{int} = 0.0584, R_{sigma} = 0.0435]
Data/restraints/parameters	7794/0/420
Goodness-of-fit on F ²	1.023
Final R indexes [$I \geq 2\sigma(I)$]	R_1 = 0.0528, wR_2 = 0.1264
Final R indexes [all data]	R_1 = 0.0734, wR_2 = 0.1402
Largest diff. peak/hole / e Å ⁻³	0.43/-0.51
Flack parameter	0.13(5)

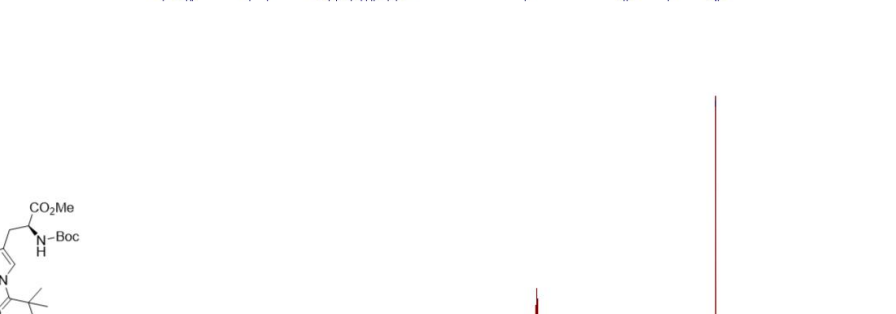
Chemical structure of compound 10 is shown in the top left. The ^1H NMR spectrum (CDCl₃) is displayed below, showing peaks corresponding to the structure. The x-axis represents the chemical shift in ppm (f1), ranging from 1.5 to -1.0. The y-axis represents intensity. Integration values are provided below the baseline, and chemical shifts are listed above the peaks.

Chemical Shift (ppm)	Integration
~8.129	1.04
~7.620	1.07
~7.553	1.06
~7.329	1.09
~7.300	1.14
~6.453	1.00
~5.264	0.86
~4.757	0.88
~3.713	3.19
~3.314	2.04
~3.295	
~3.284	
~3.222	
~3.171	
~3.197	
~3.180	
~1.449	9.19
~1.439	9.26

Chemical structure of the compound is shown above the spectrum. The structure is a substituted indole derivative with a Boc-protected amine and a methyl ester group.

¹³C NMR spectrum (CDCl₃) showing peaks at the following chemical shifts (ppm):

- 178.657
- 172.321
- 171.209
- 170.770
- 155.127
- 150.321
- 133.548
- 132.522
- 132.518
- 124.779
- 123.369
- 121.977
- 121.284
- 119.285
- 115.231
- 80.211
- 53.299
- 52.464
- 41.268
- 28.389
- 28.314
- 27.662

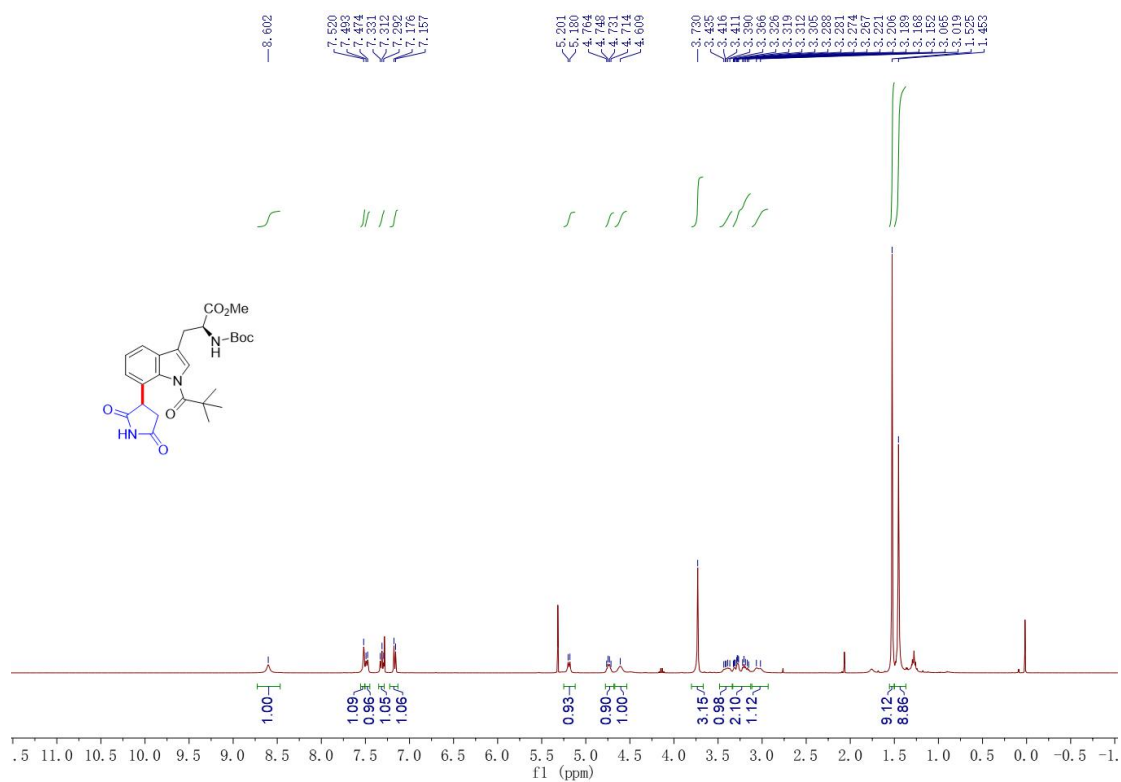


Chemical structure of the compound is shown above the spectrum. The structure is a substituted indole derivative with a Boc-protected amine and a methyl ester group.

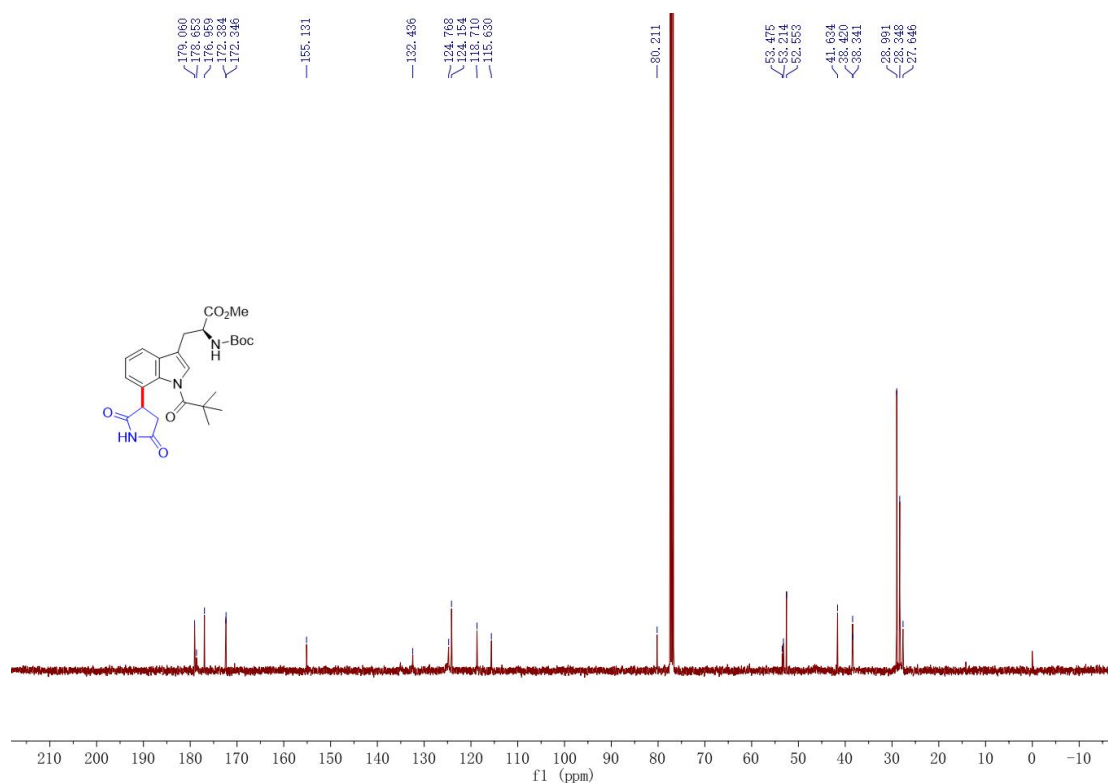
¹³C NMR spectrum (CDCl₃) showing peaks at the following chemical shifts (ppm):

- 178.657
- 172.321
- 171.209
- 170.770
- 155.127
- 150.321
- 133.548
- 132.522
- 132.518
- 124.779
- 123.369
- 121.977
- 121.284
- 119.285
- 115.231
- 80.211
- 53.299
- 52.464
- 41.268
- 28.389
- 28.314
- 27.662

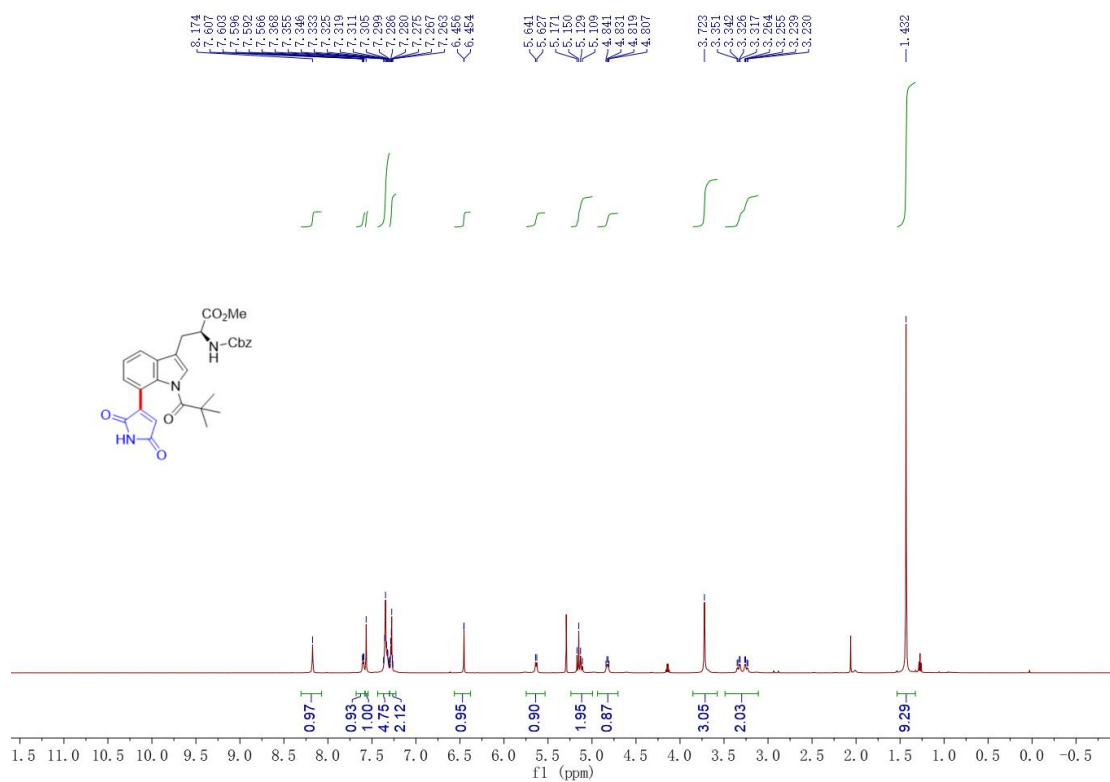
S31



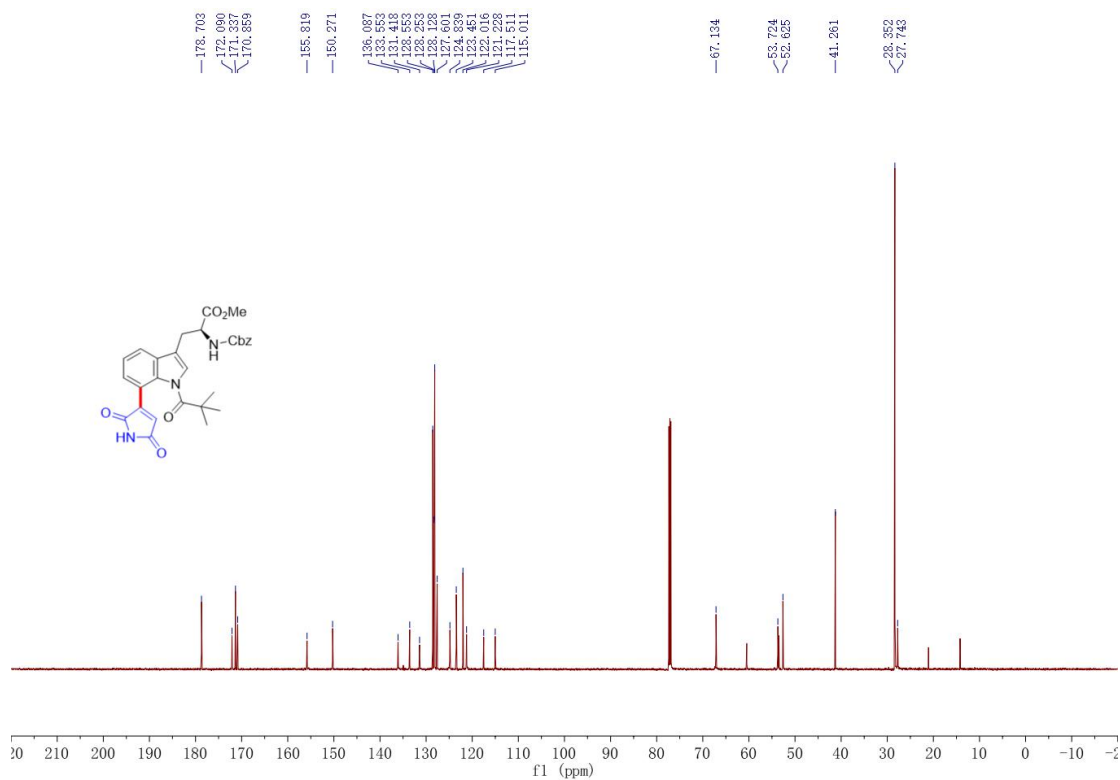
¹H NMR (400 MHz, CDCl₃) spectrum of **3aa**



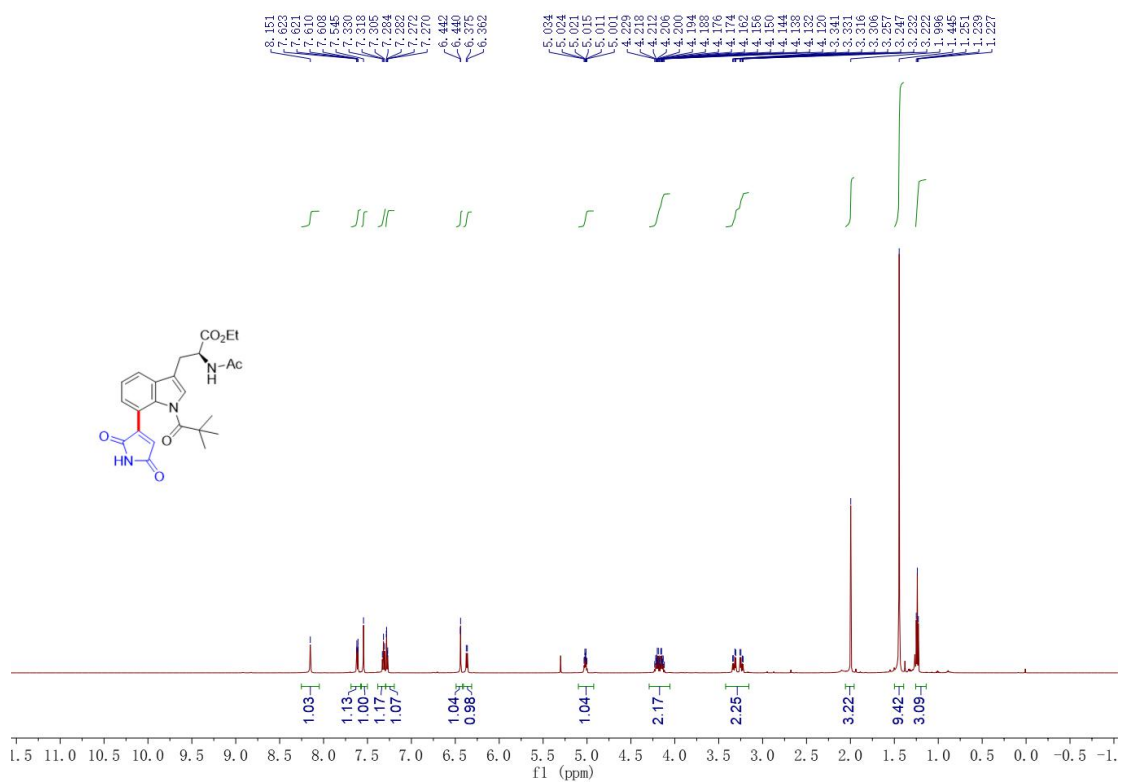
¹³C NMR (101 MHz, CDCl₃) spectrum of **3aa**



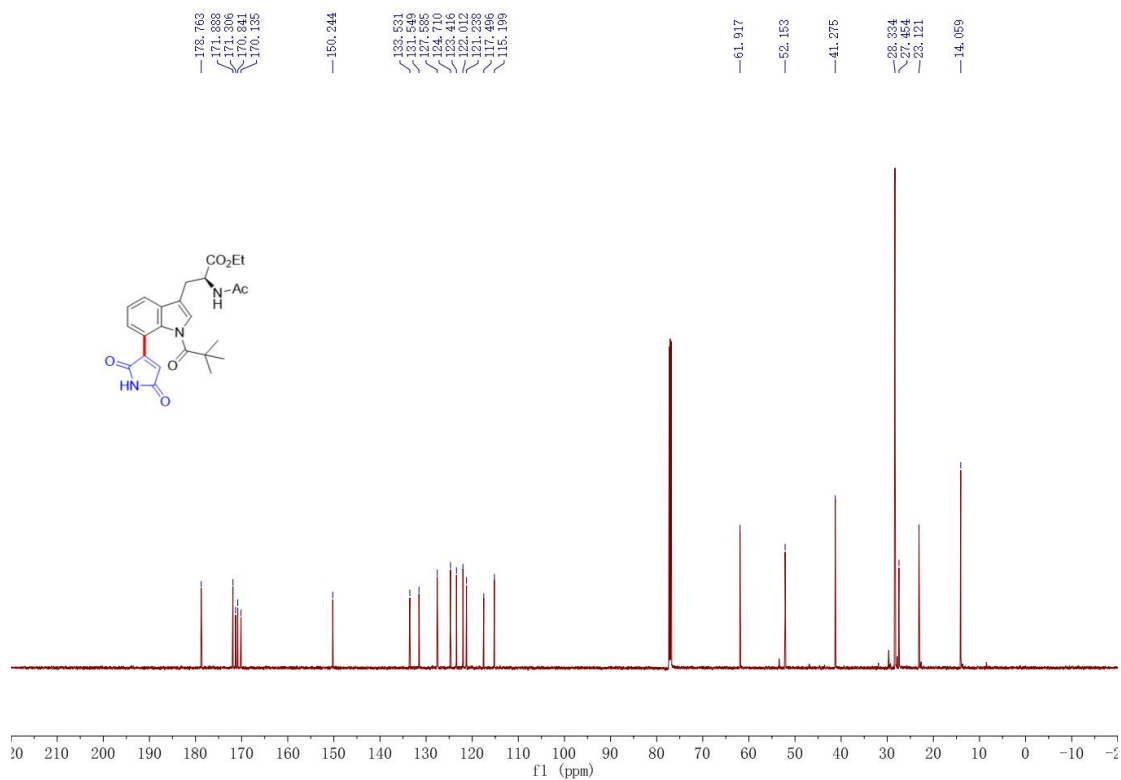
¹H NMR (600 MHz, CDCl₃) spectrum of **3b**



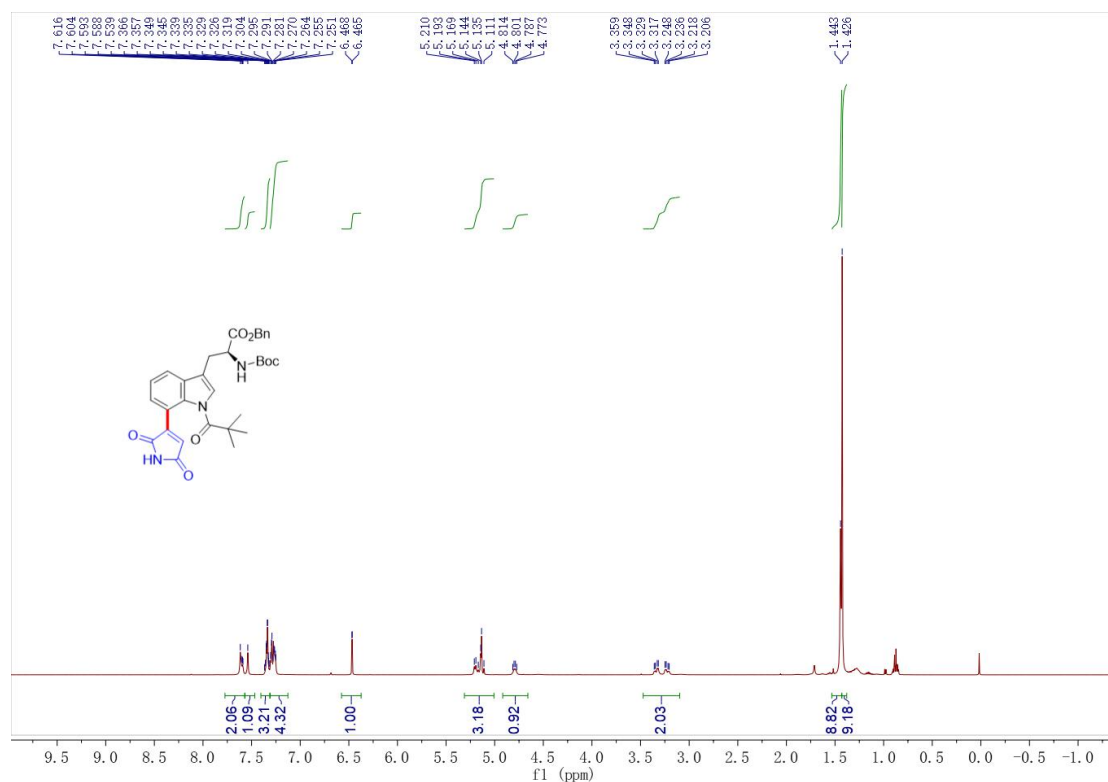
¹³C NMR (151 MHz, CDCl₃) spectrum of **3b**



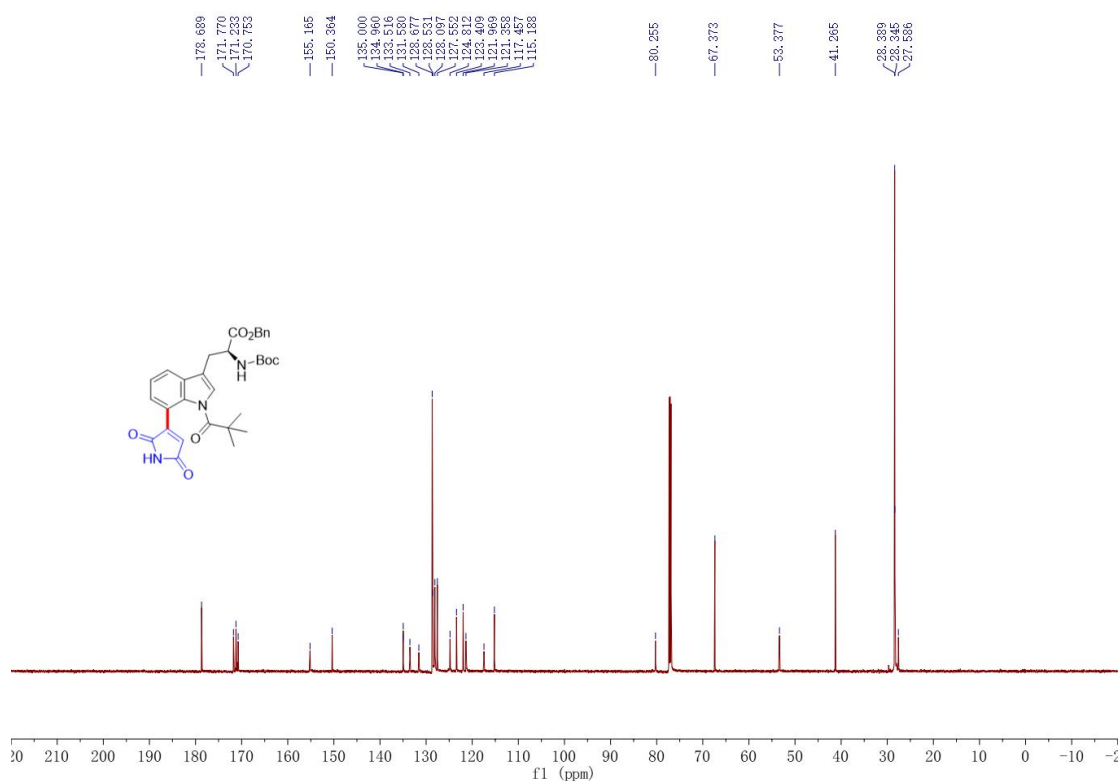
¹H NMR (600 MHz, CDCl₃) spectrum of **3c**



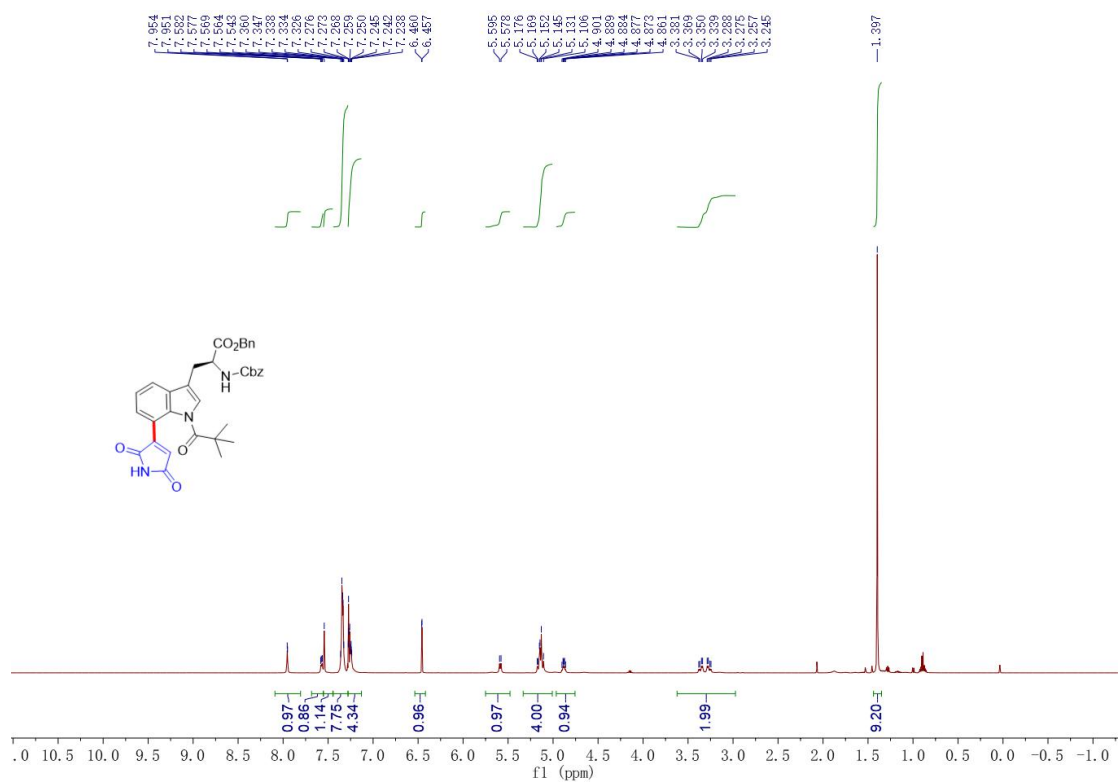
¹³C NMR (151 MHz, DMSO) spectrum of **3c**



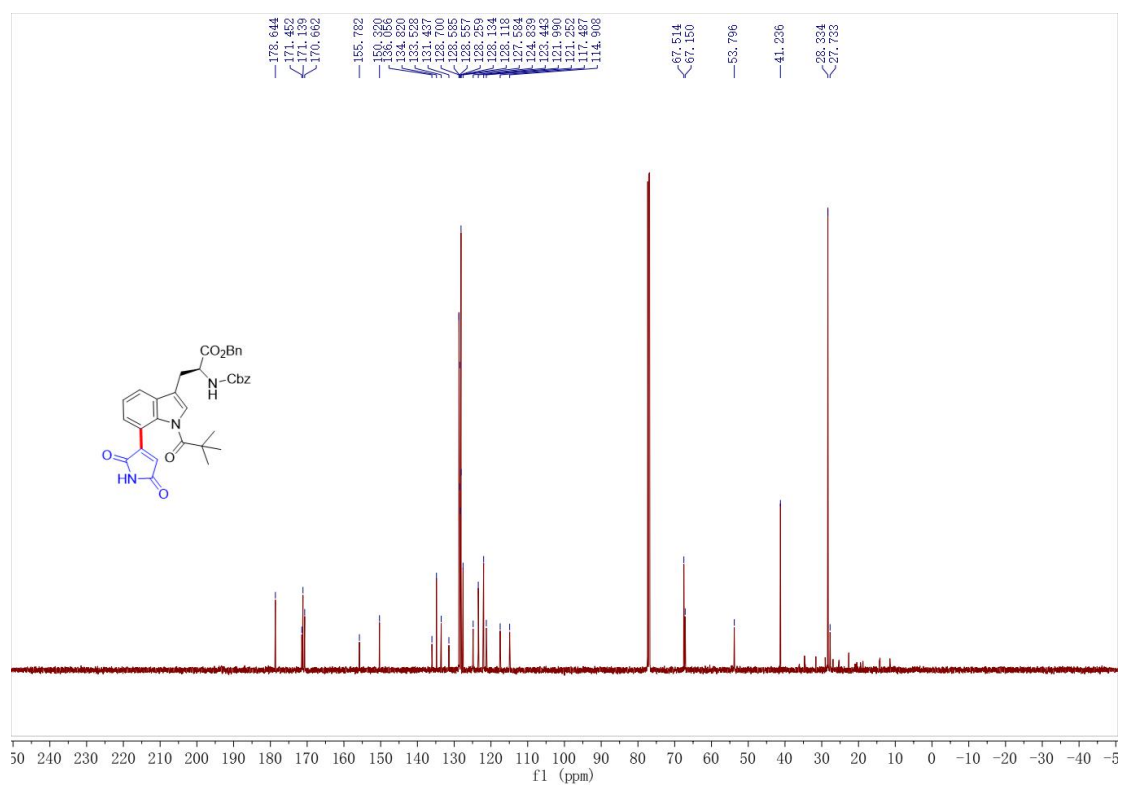
¹H NMR (500 MHz, CDCl₃) spectrum of **3d**



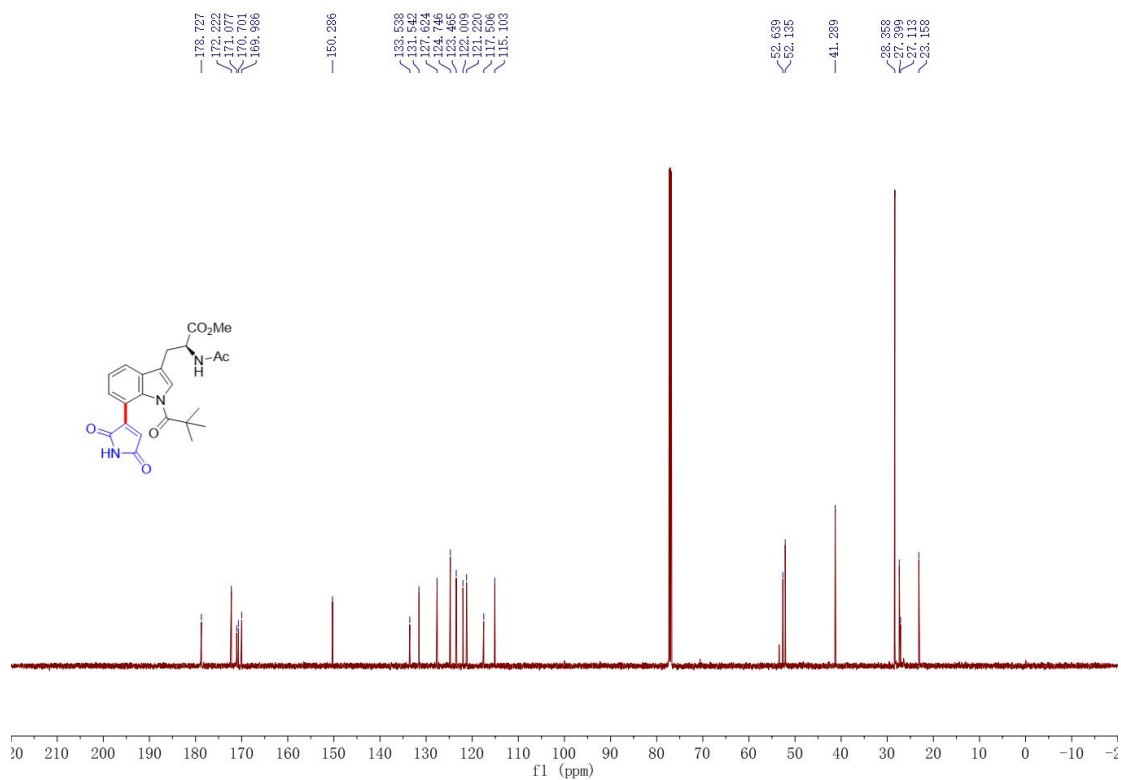
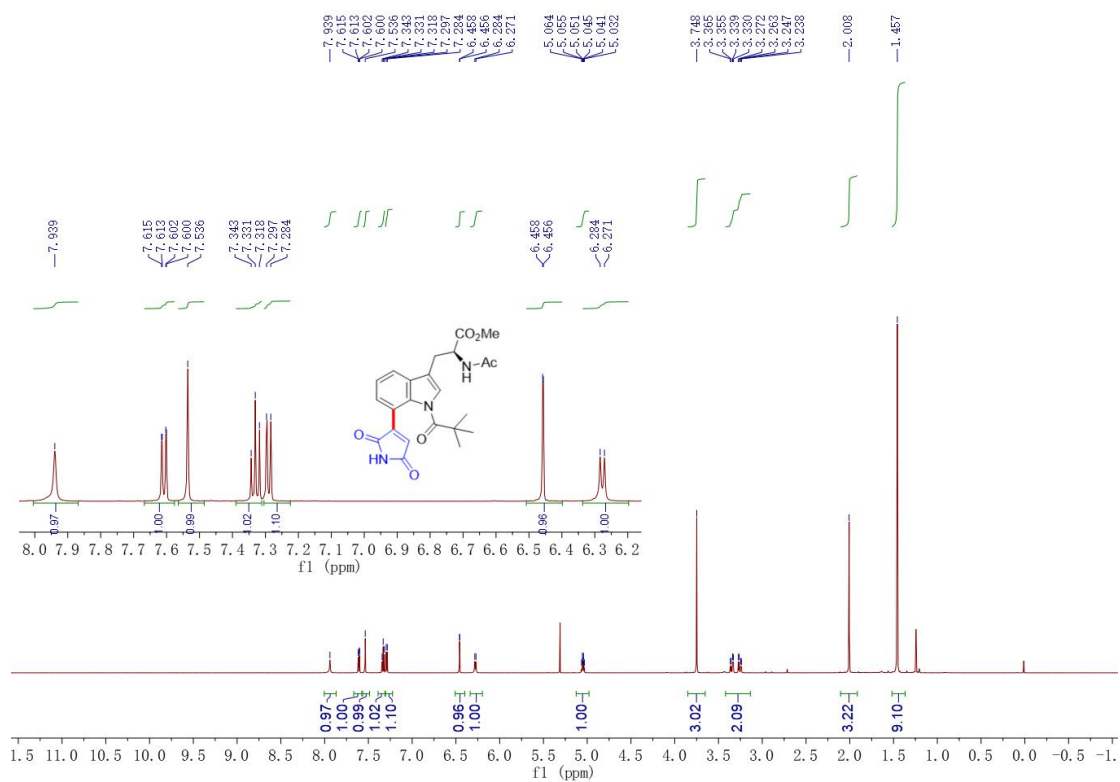
¹³C NMR (126 MHz, CDCl₃) spectrum of **3d**

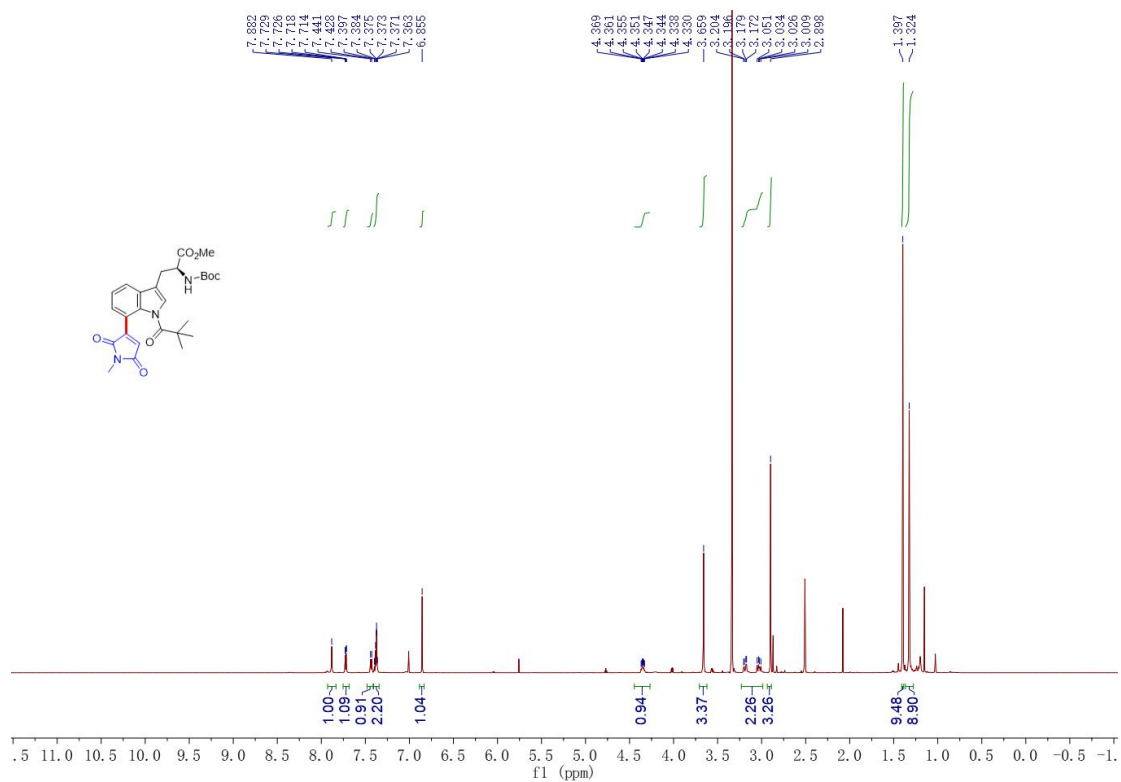


¹H NMR (500 MHz, CDCl₃) spectrum of 3e

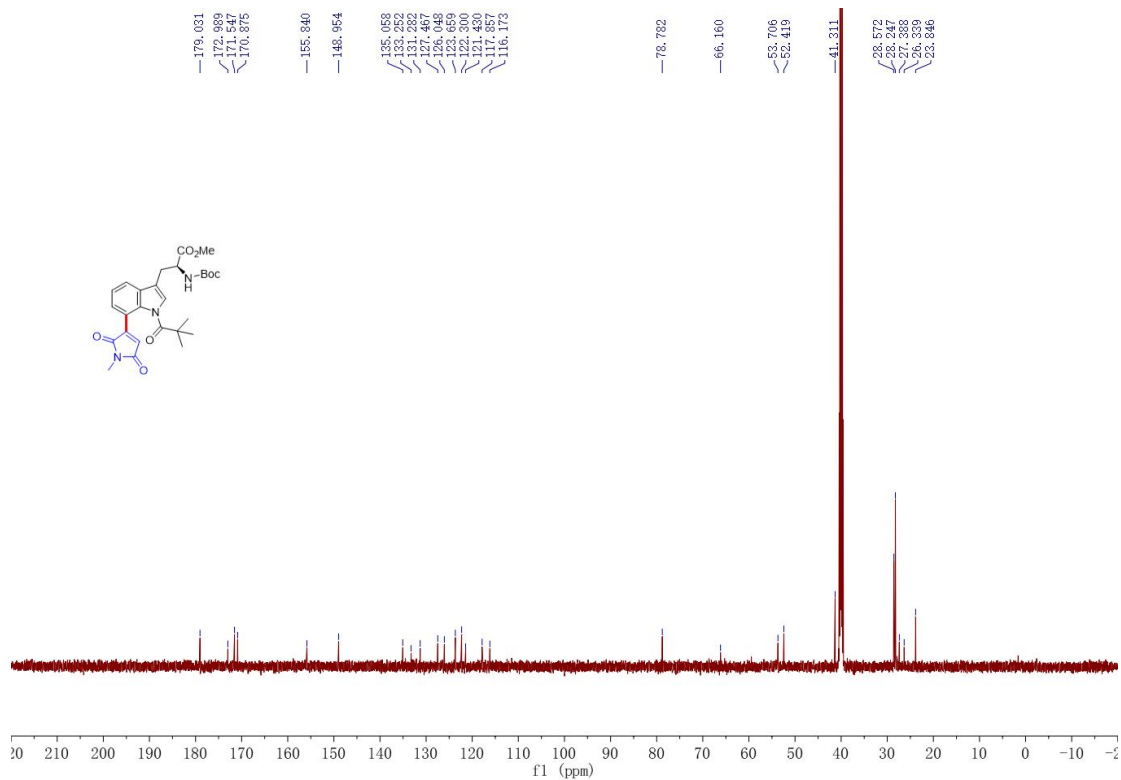


¹³C NMR (126 MHz, CDCl₃) spectrum of 3e

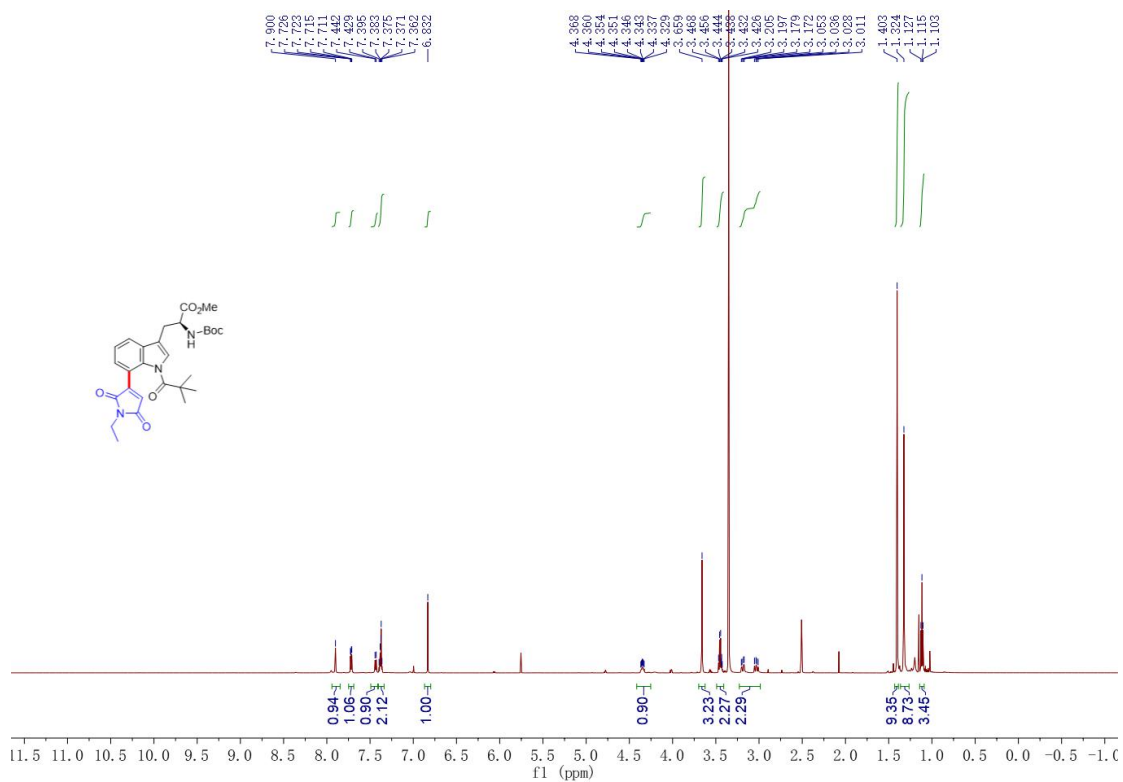




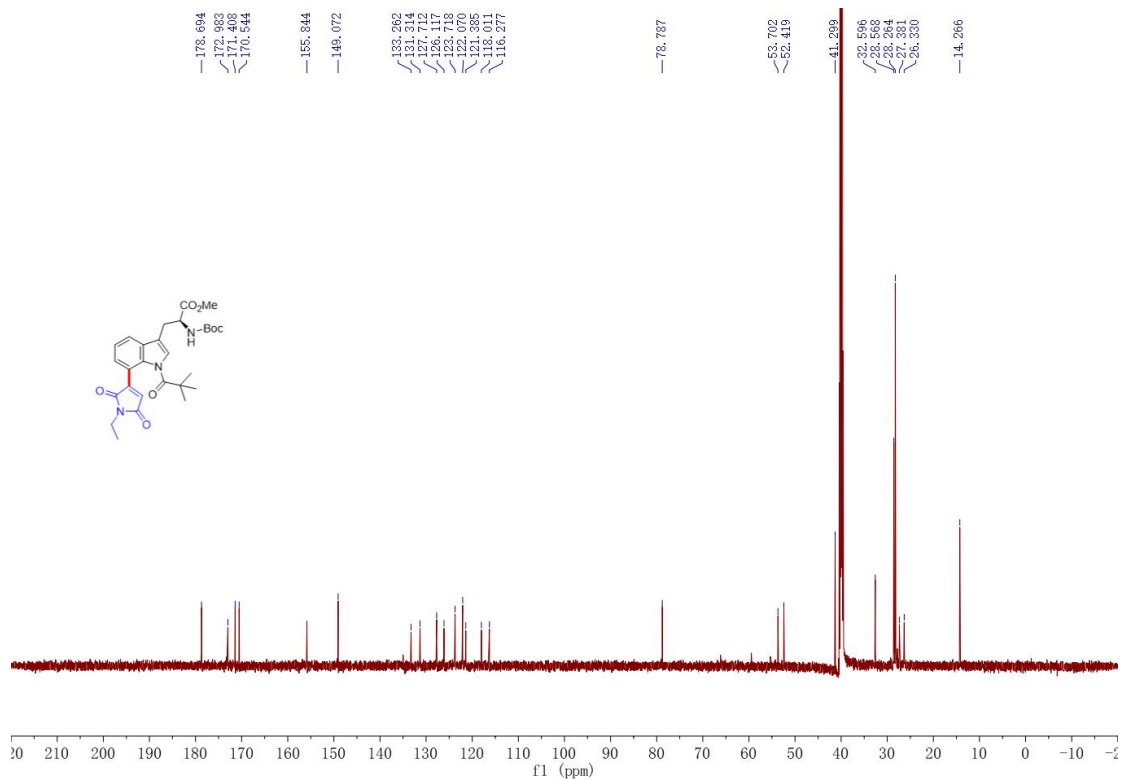
¹H NMR (600 MHz, DMSO) spectrum of **3g**



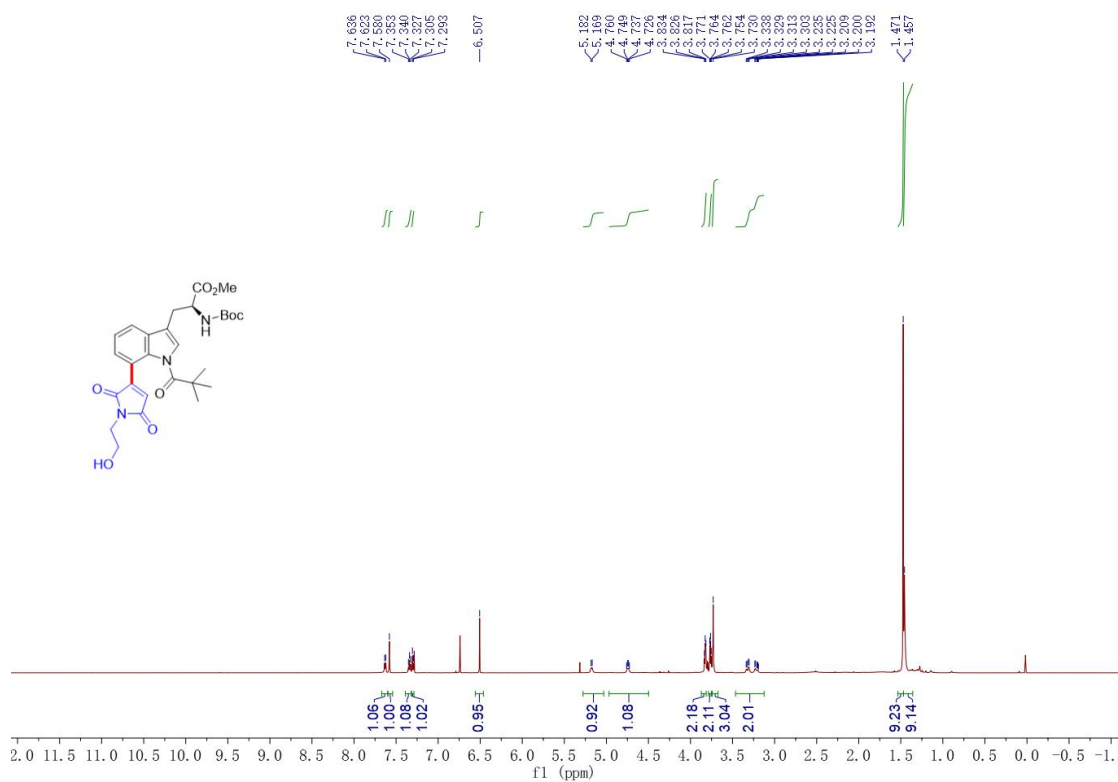
¹³C NMR (151 MHz, DMSO) spectrum of **3g**



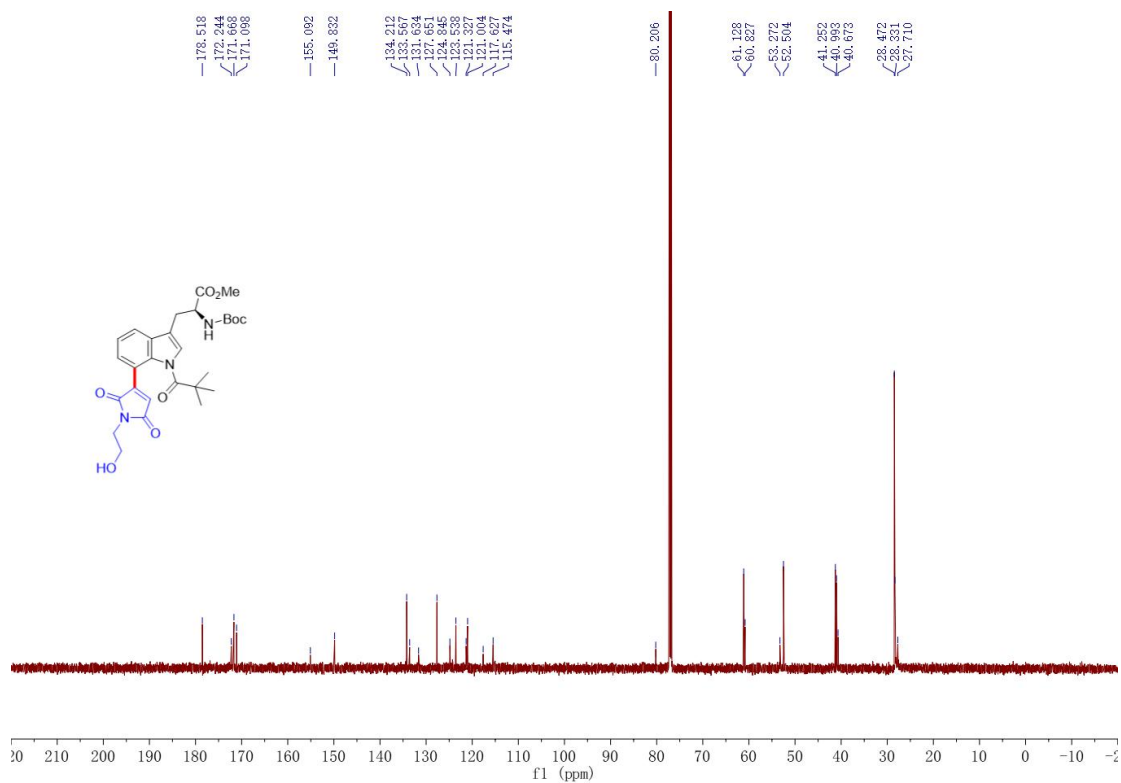
¹H NMR (600 MHz, DMSO) spectrum of 3h



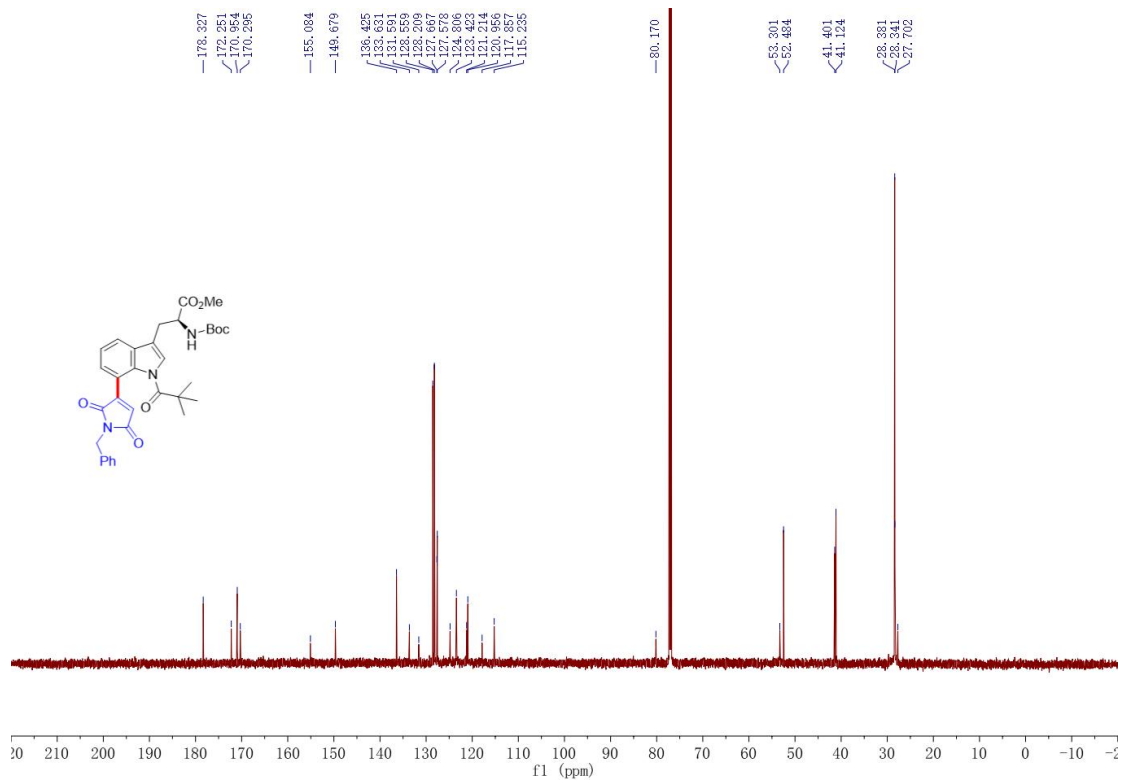
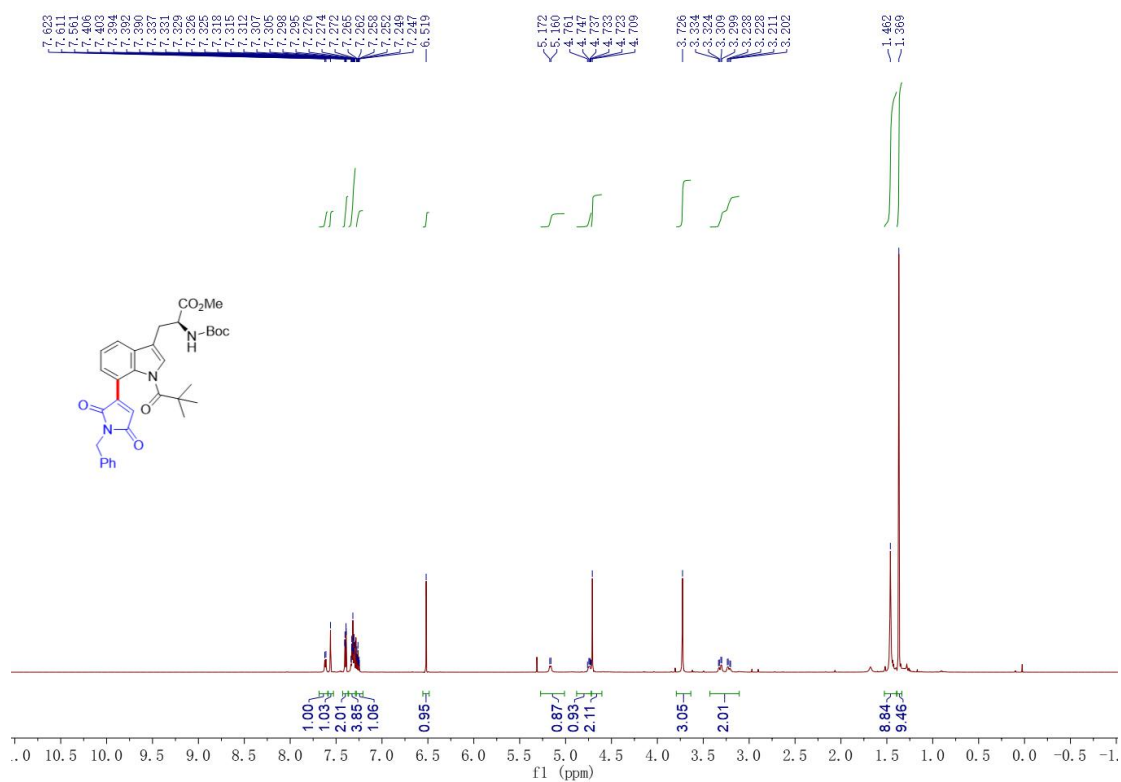
¹³C NMR (151 MHz, DMSO) spectrum of 3h

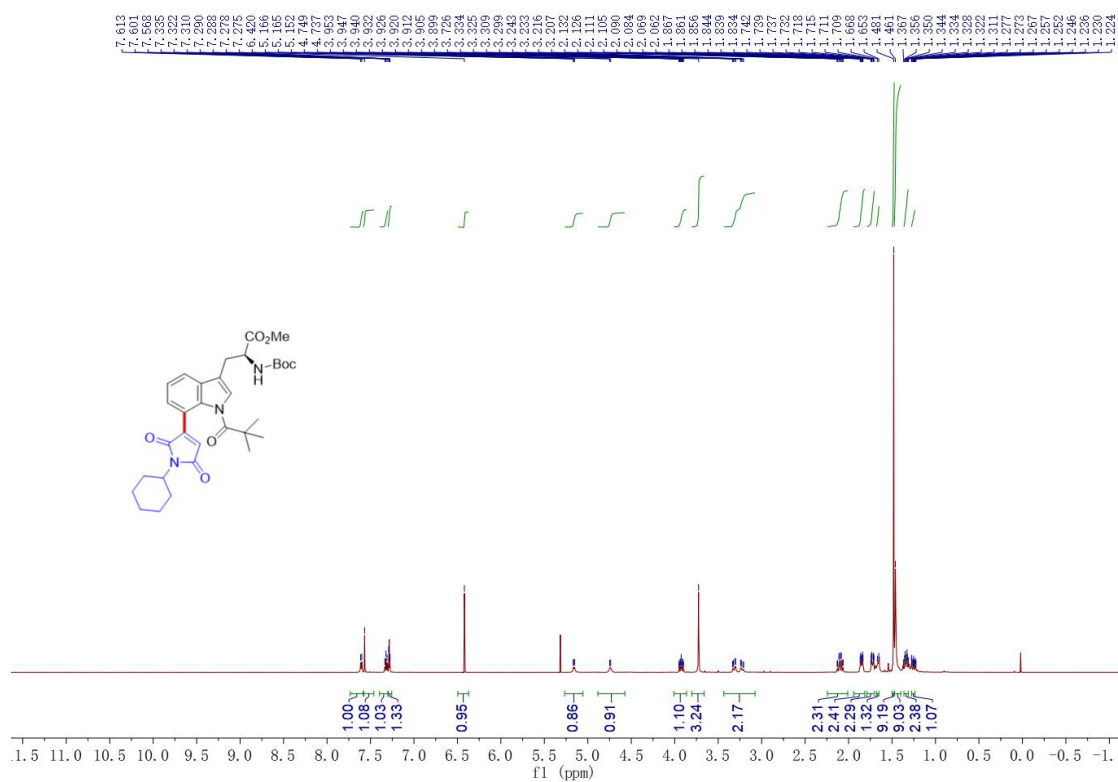


¹H NMR (600 MHz, CDCl₃) spectrum of **3i**

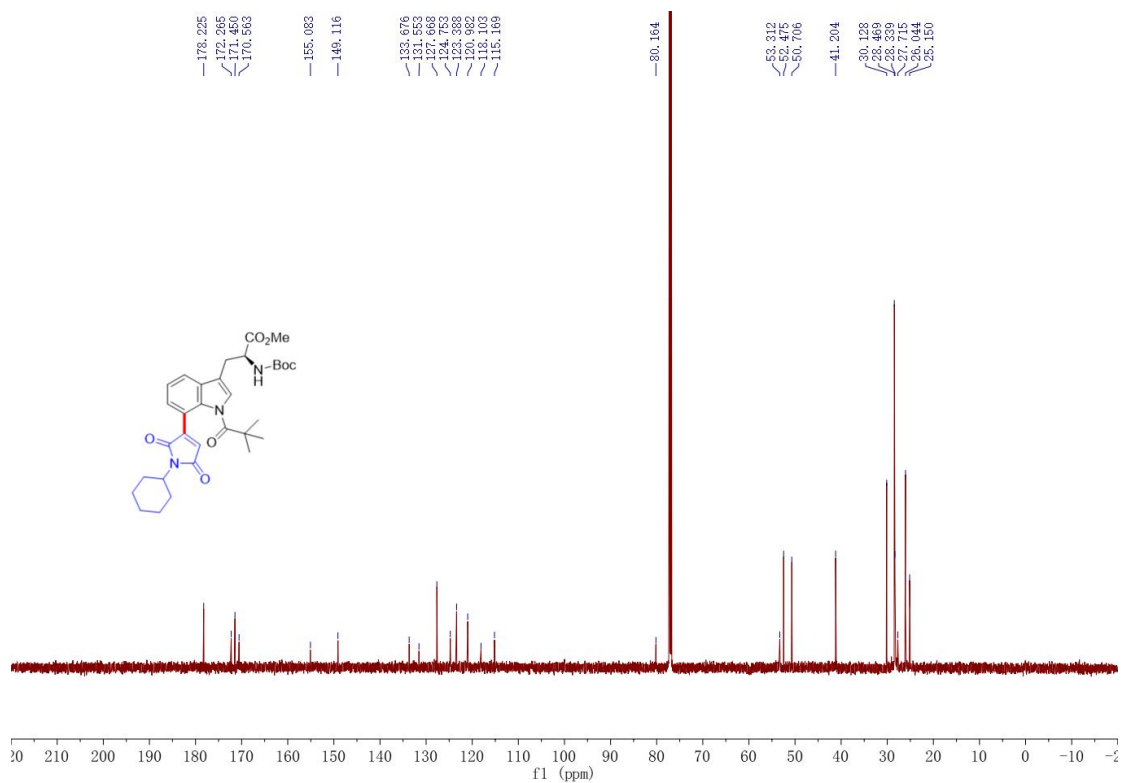


¹³C NMR (151 MHz, CDCl₃) spectrum of **3i**

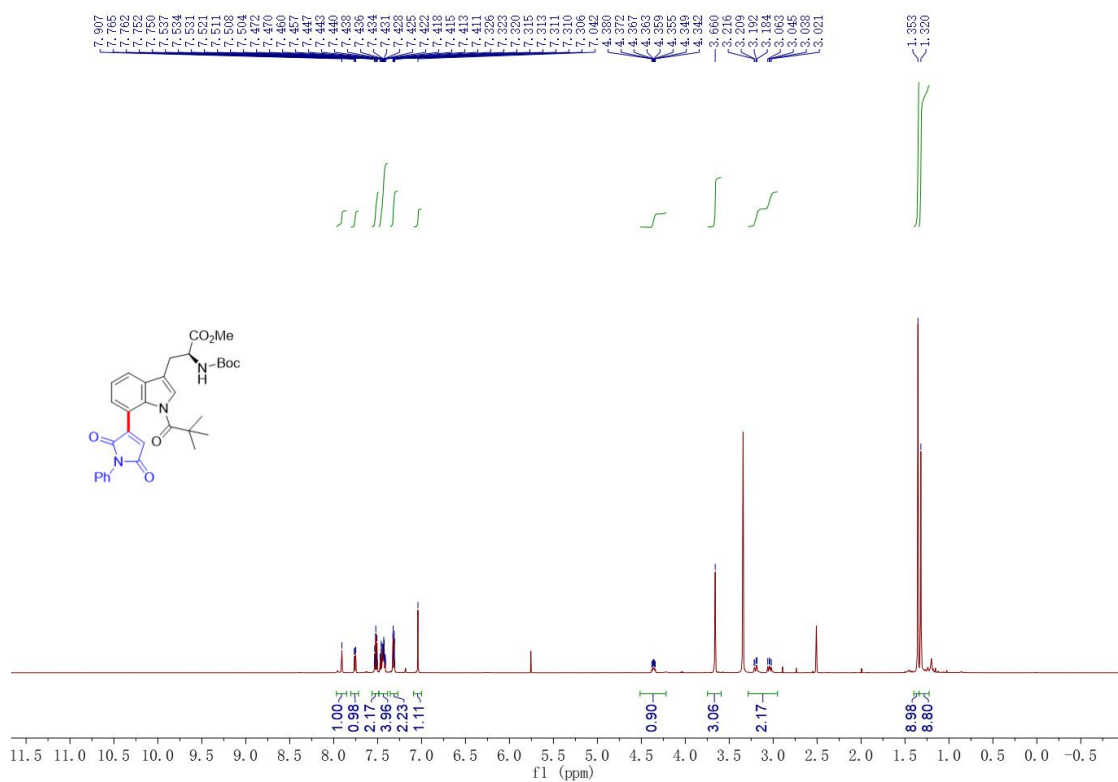




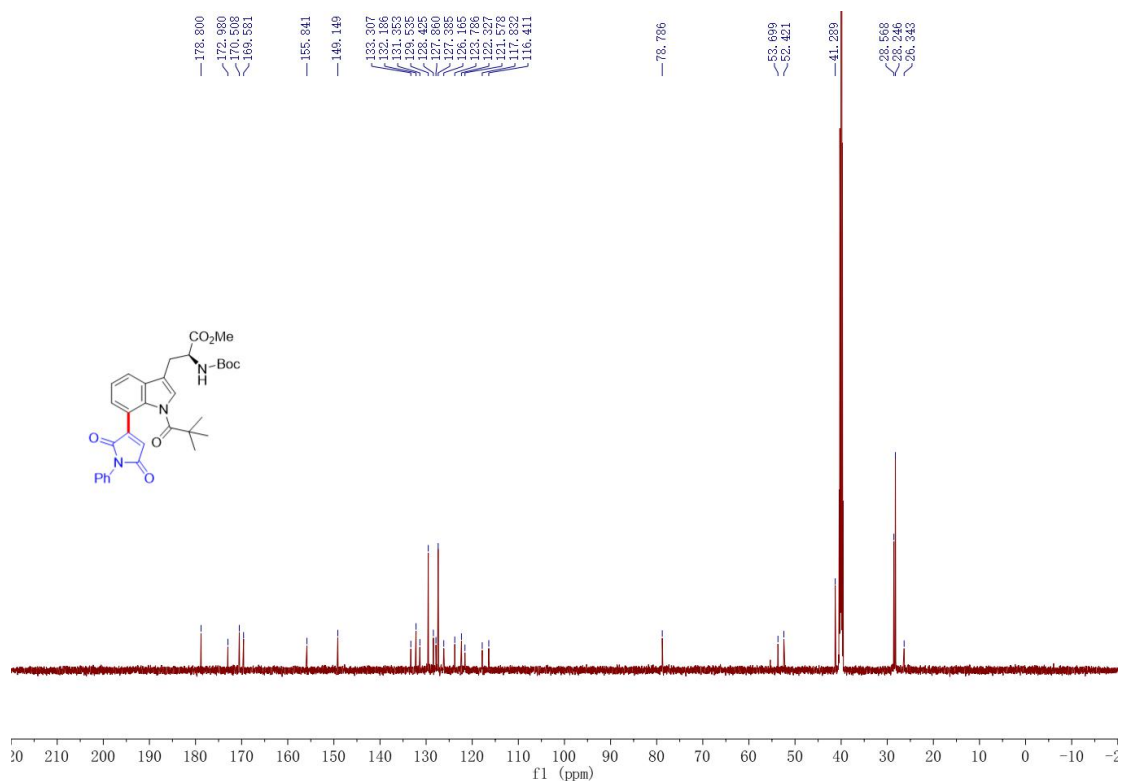
¹H NMR (600MHz, CDCl₃) spectrum of **3k**



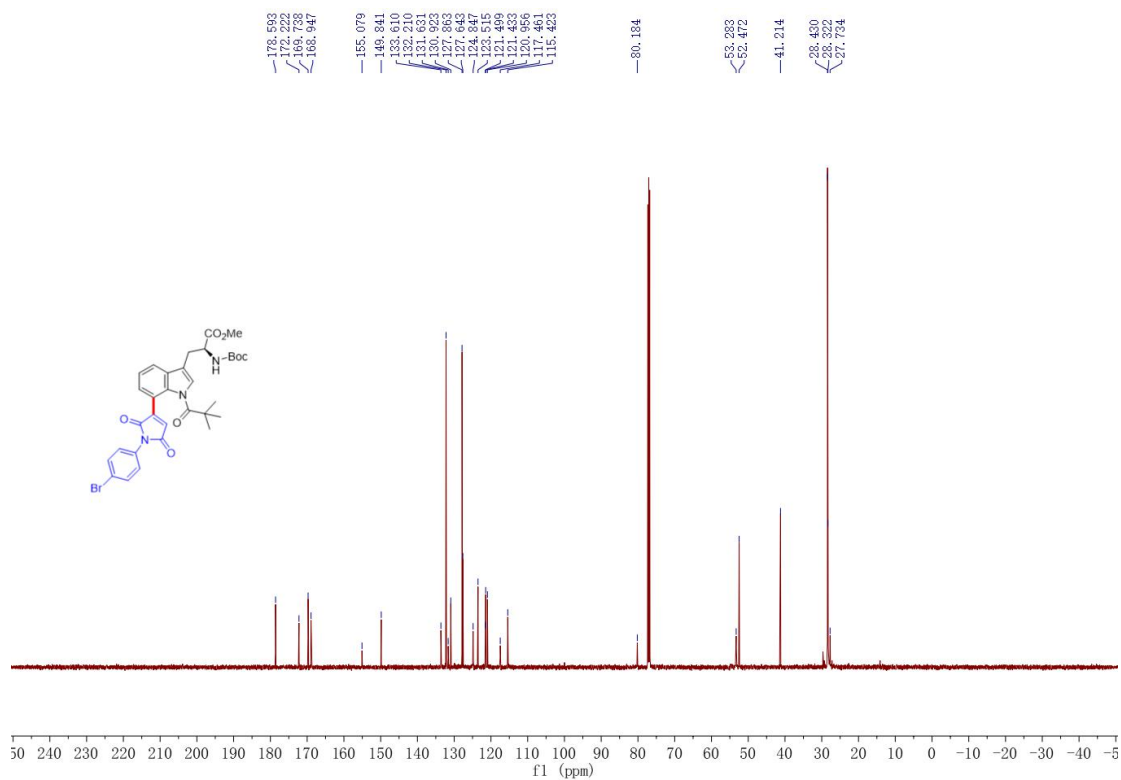
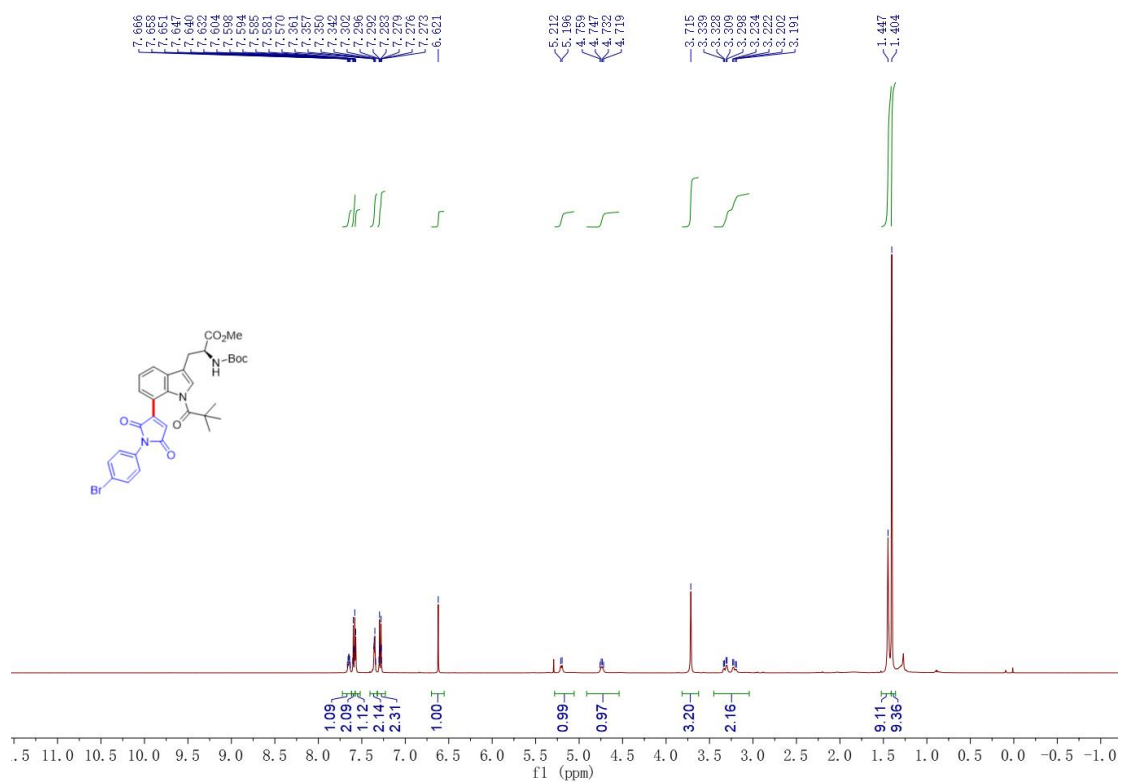
¹³C NMR (151MHz, CDCl₃) spectrum of **3k**

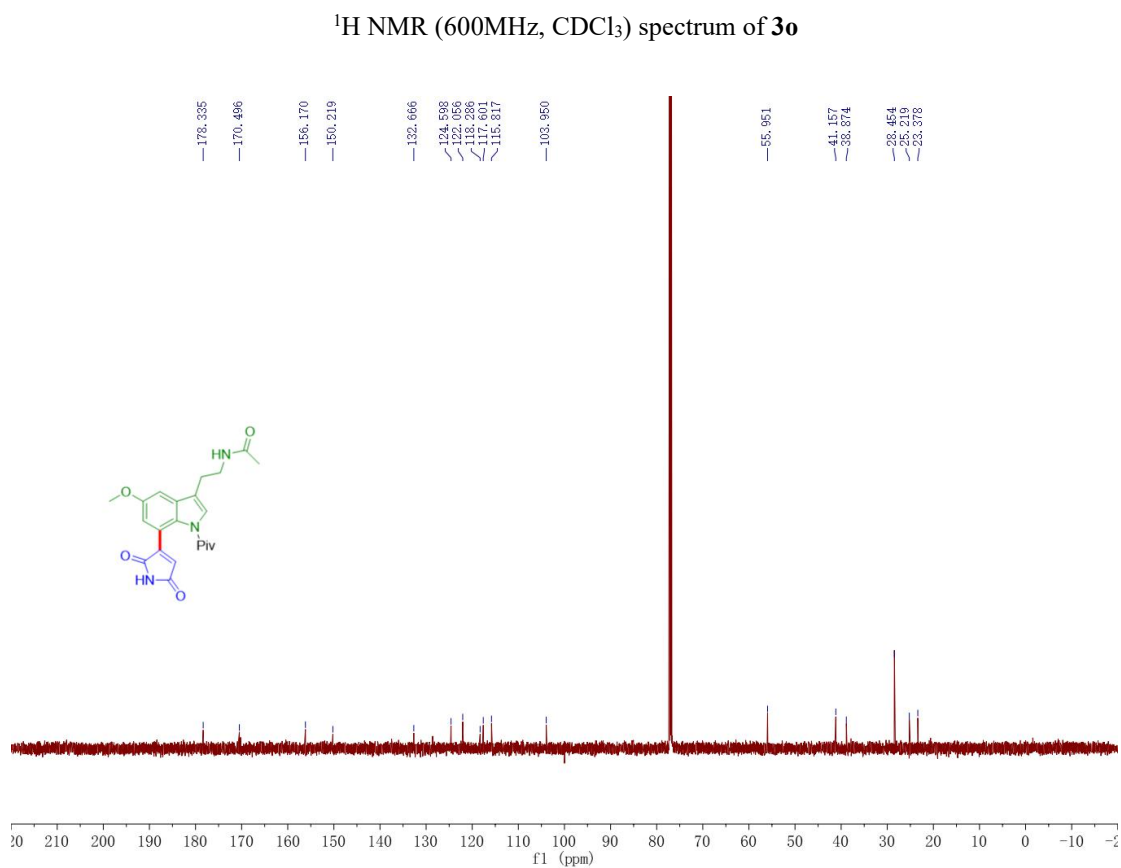
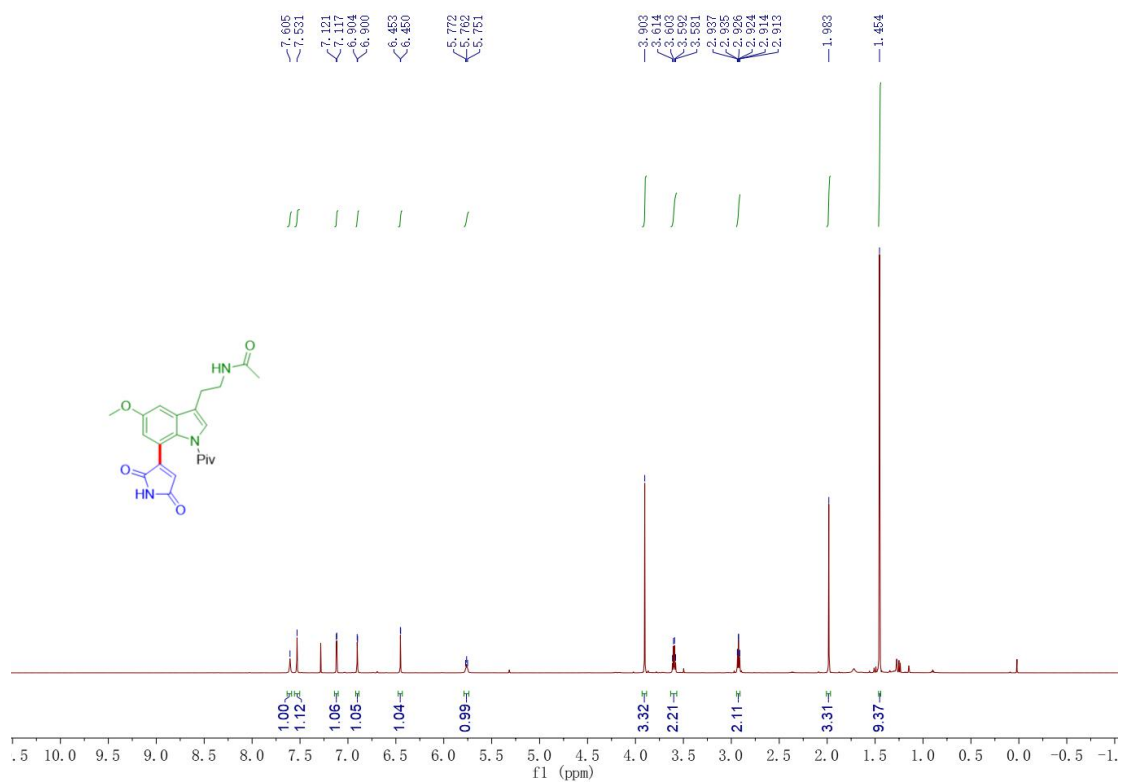


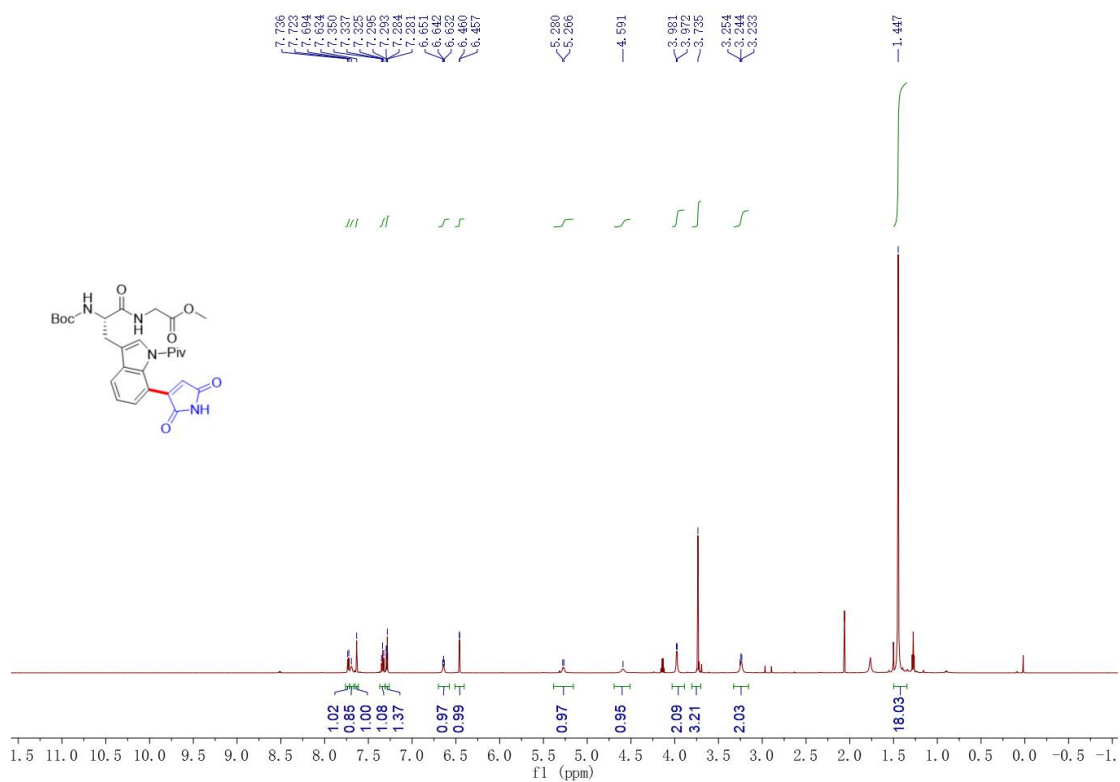
¹H NMR (600MHz, CDCl₃) spectrum of **3m**



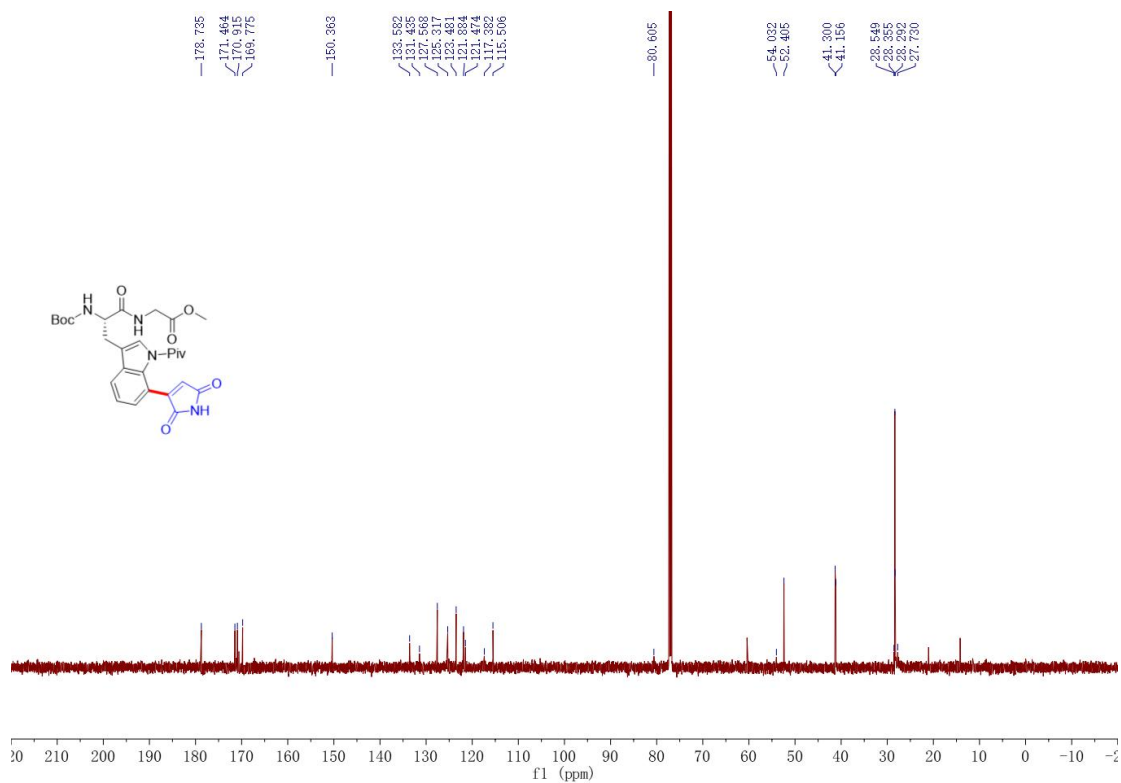
¹³C NMR (151MHz, CDCl₃) spectrum of **3m**



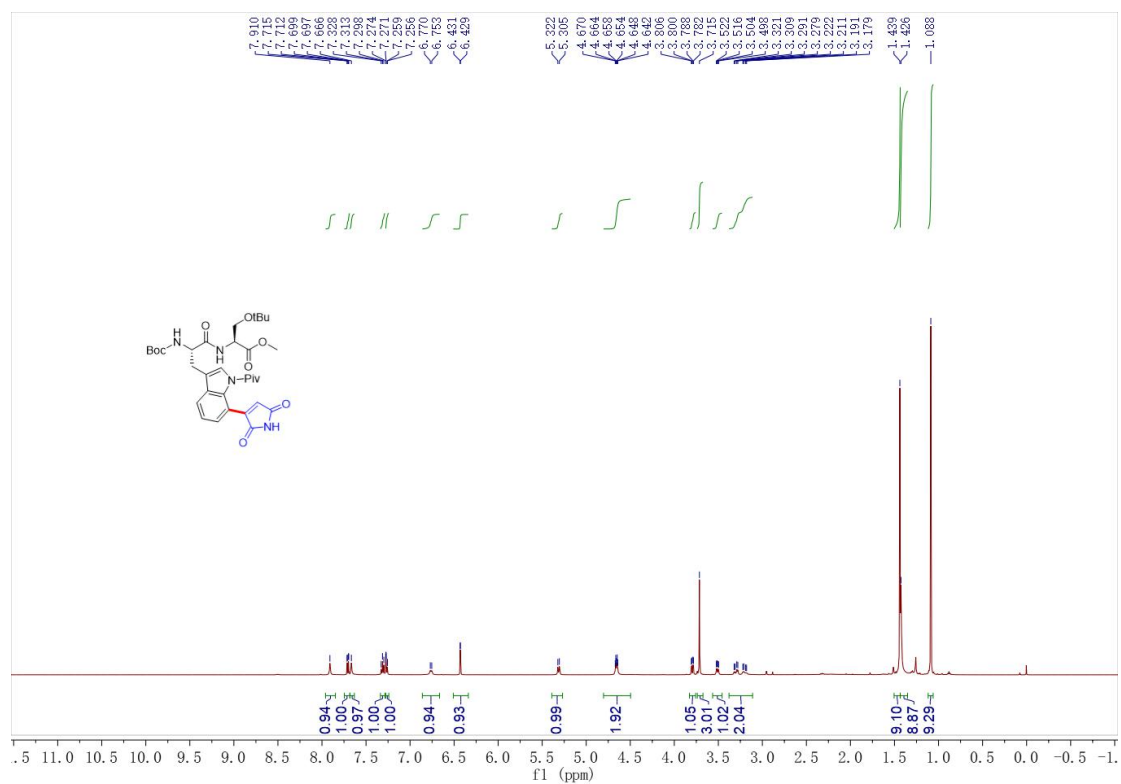




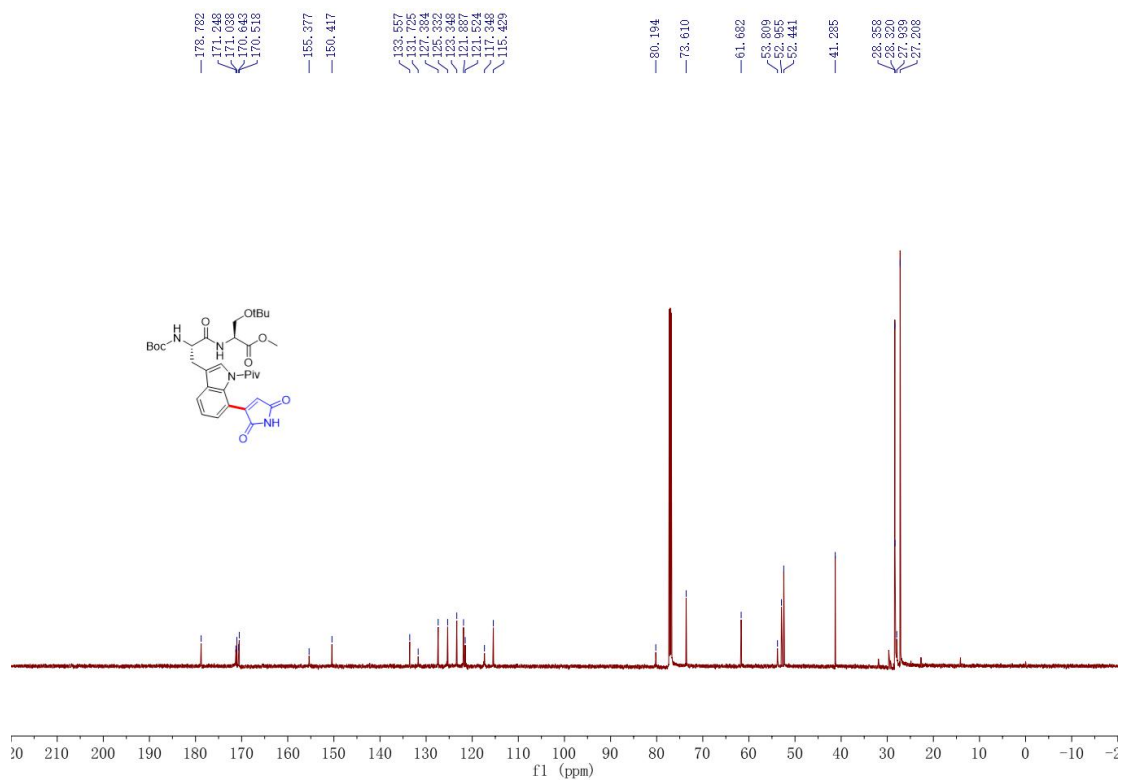
¹H NMR (600 MHz, CDCl₃) spectrum of **5a**



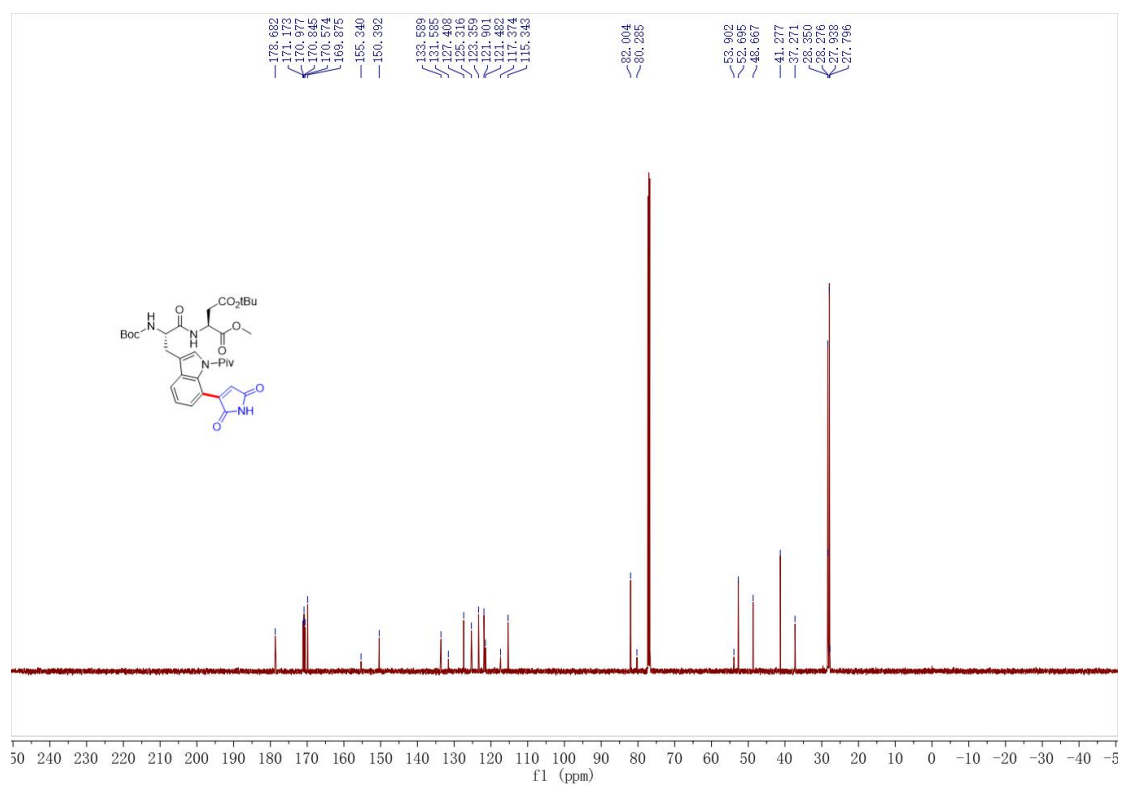
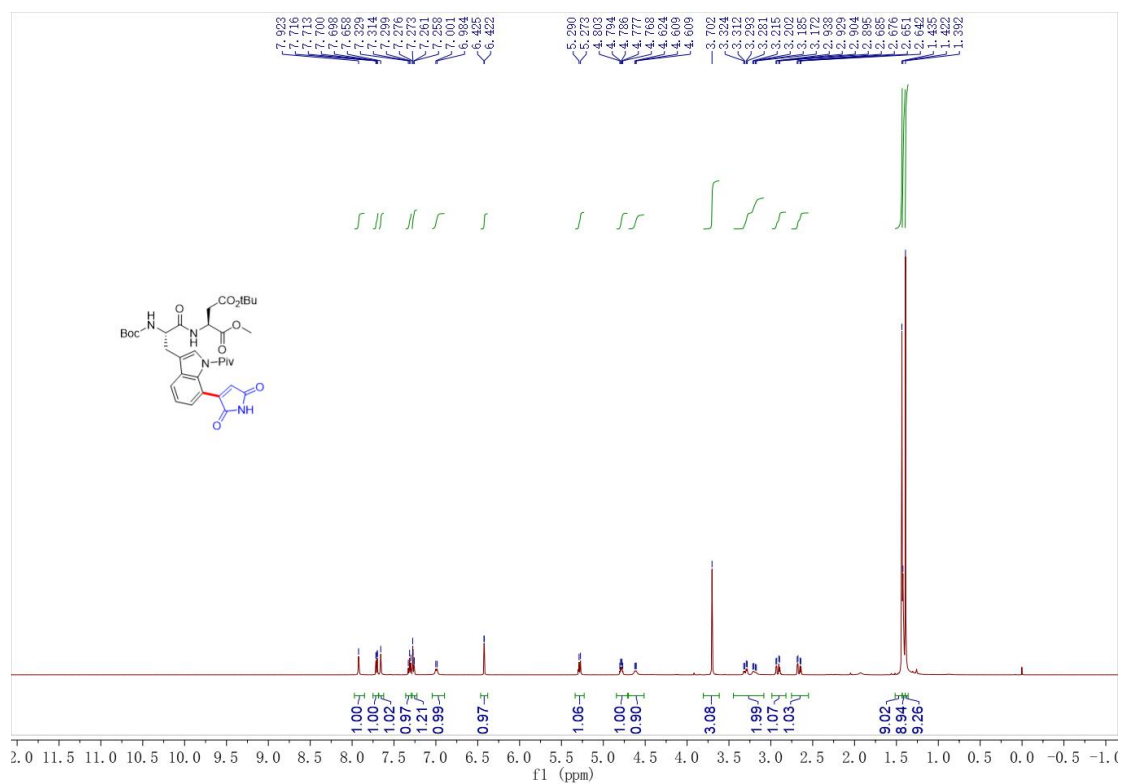
¹³C NMR (151 MHz, CDCl₃) spectrum of **5a**

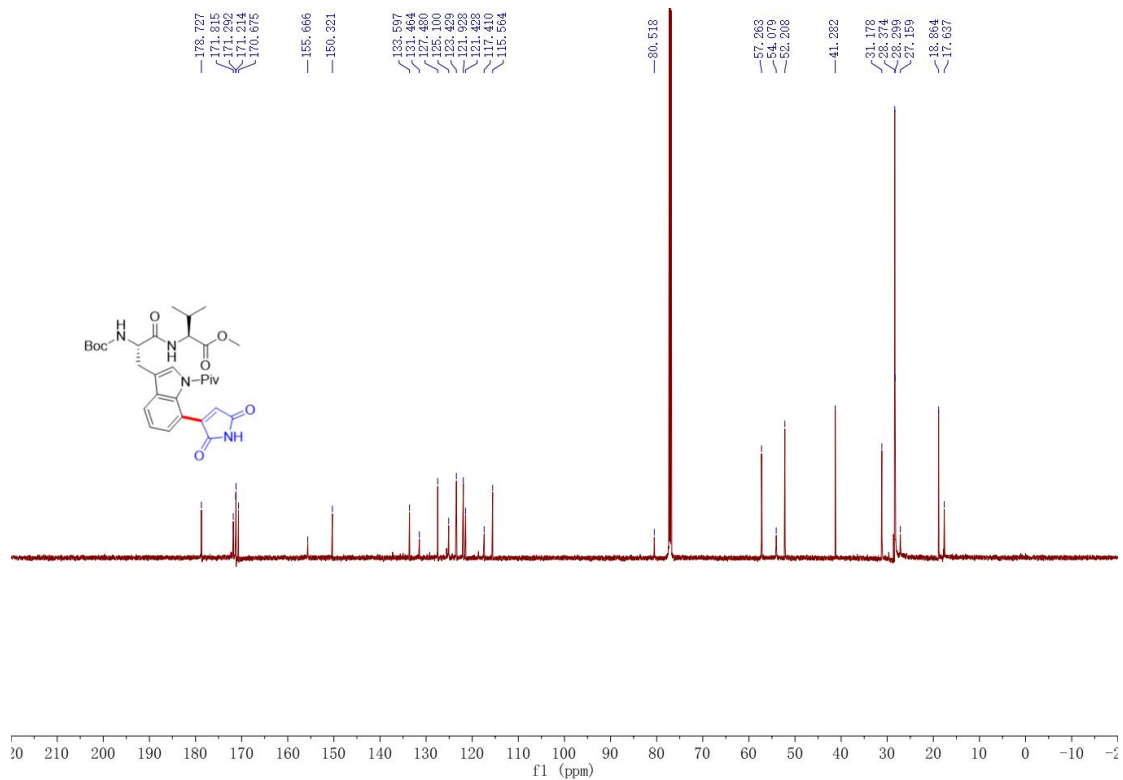
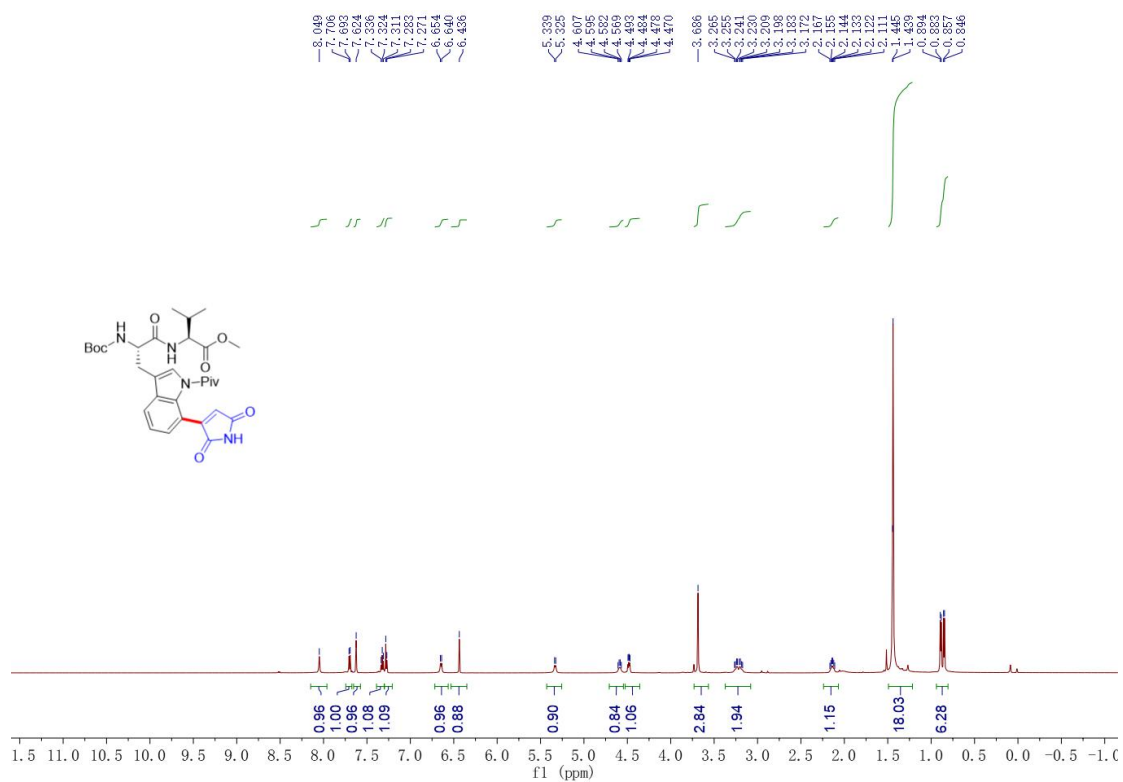


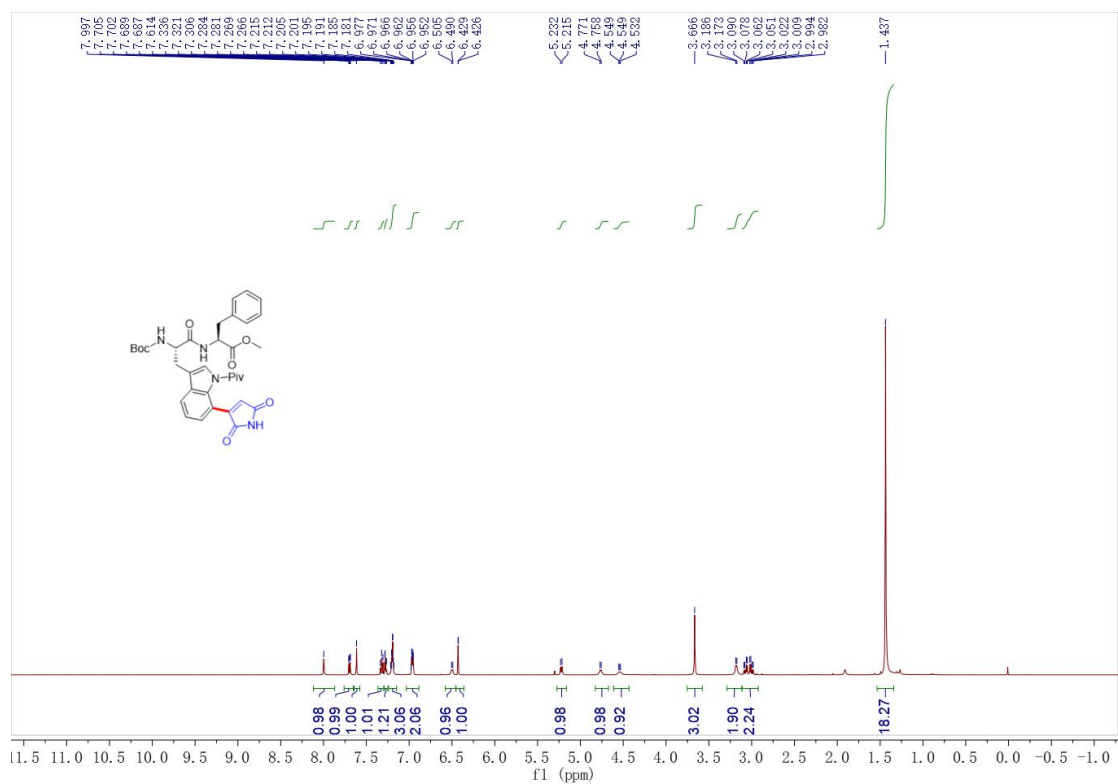
¹H NMR (500 MHz, CDCl₃) spectrum of **5b**



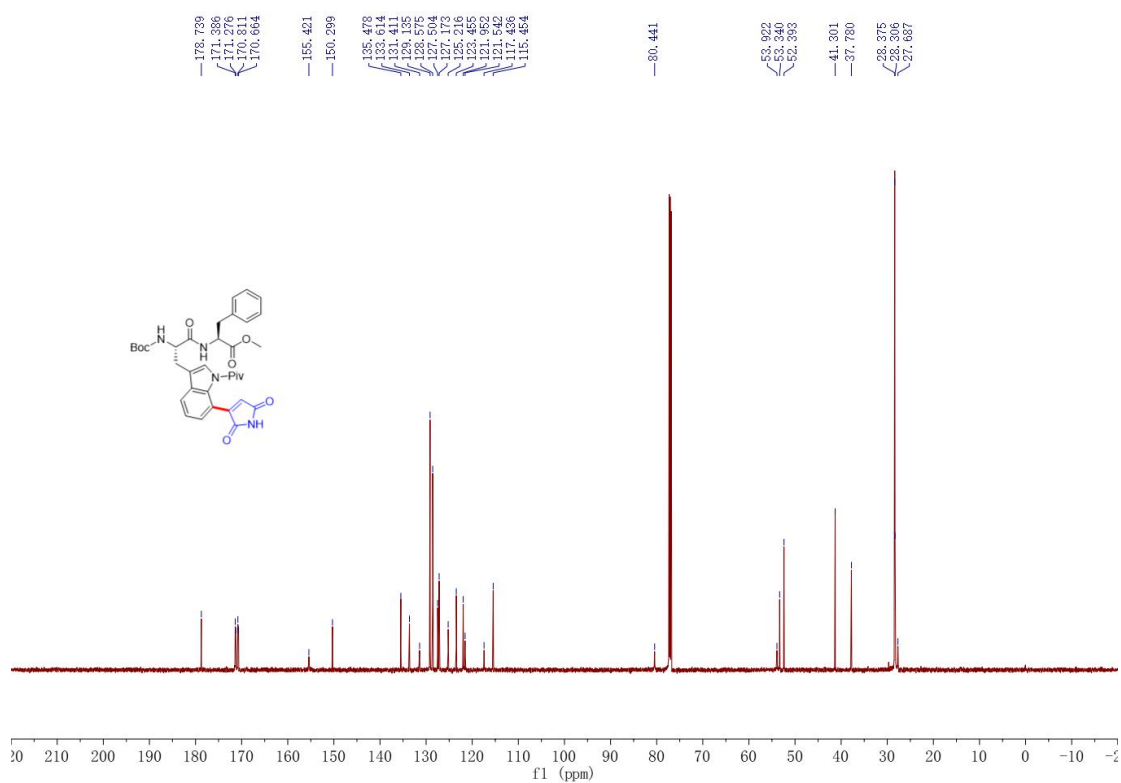
¹³C NMR (126 MHz, CDCl₃) spectrum of **5b**



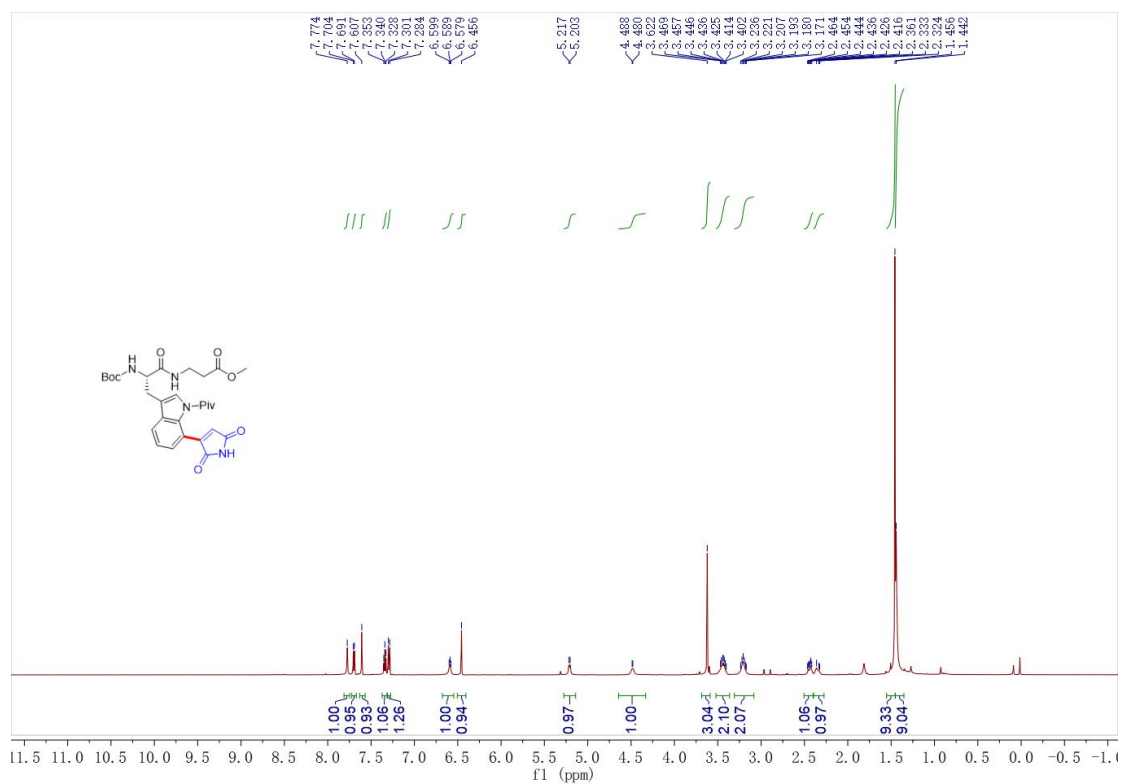




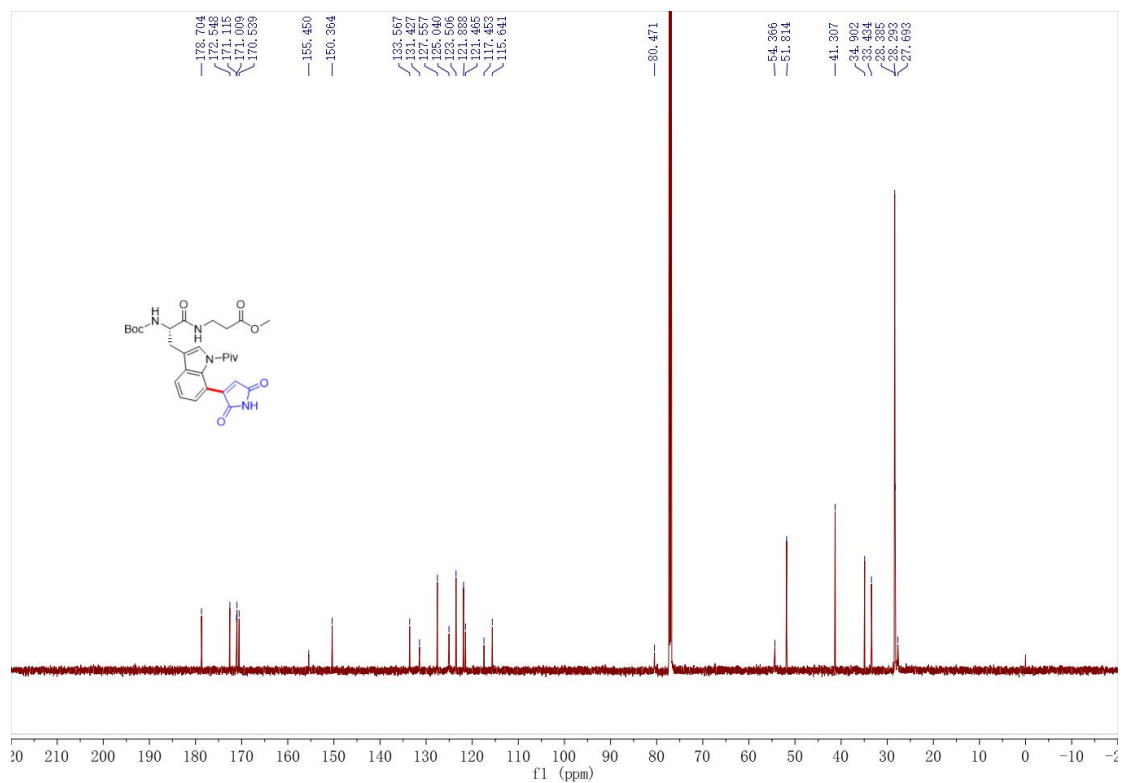
^1H NMR (500 MHz, CDCl_3) spectrum of **5e**



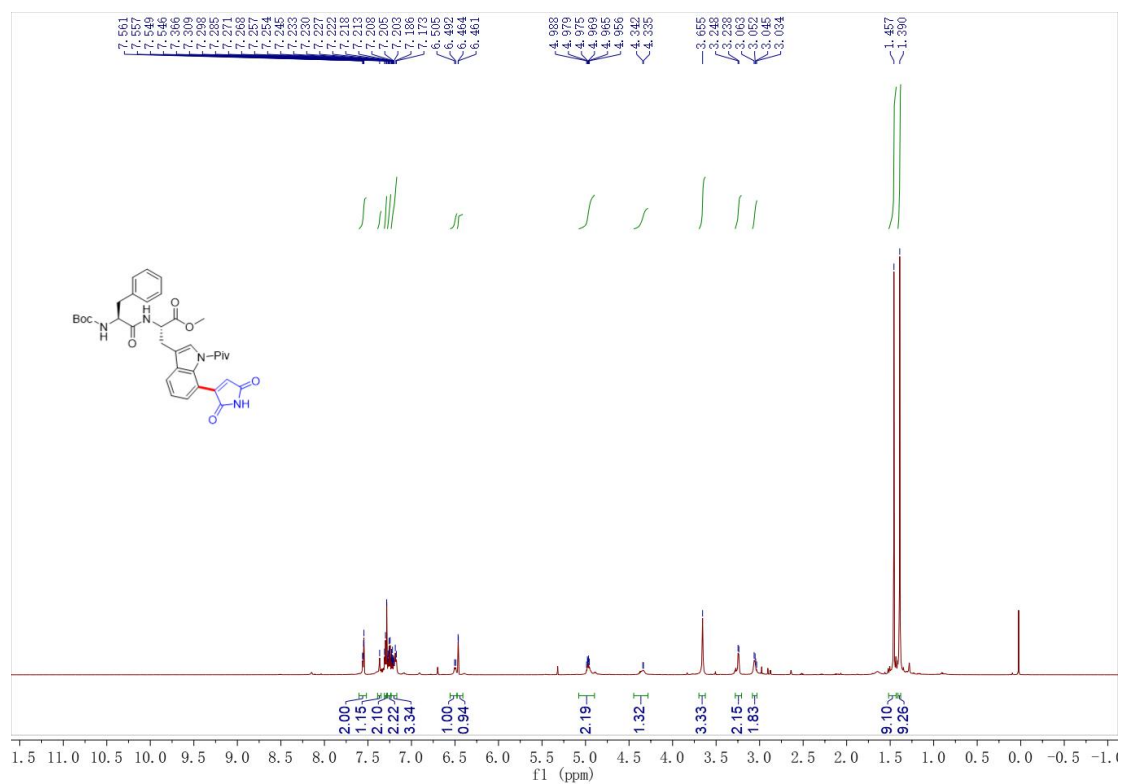
^{13}C NMR (126 MHz, CDCl_3) spectrum of **5e**



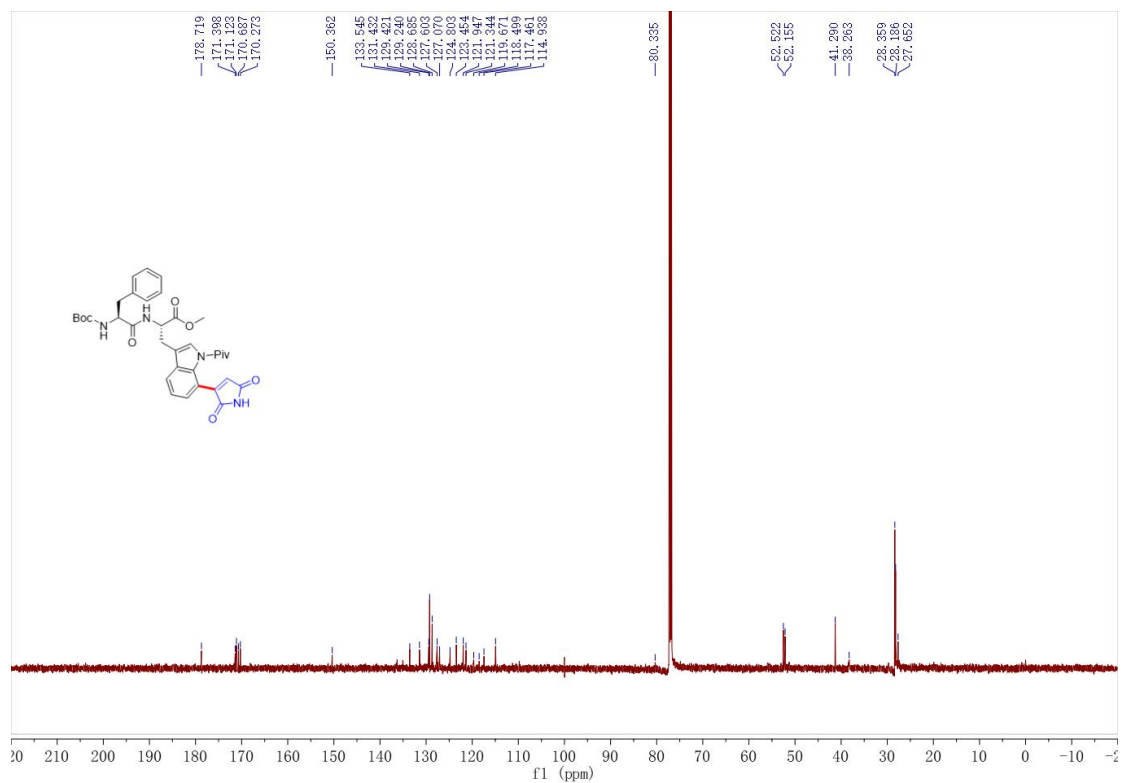
¹H NMR (600 MHz, CDCl₃) spectrum of **5f**



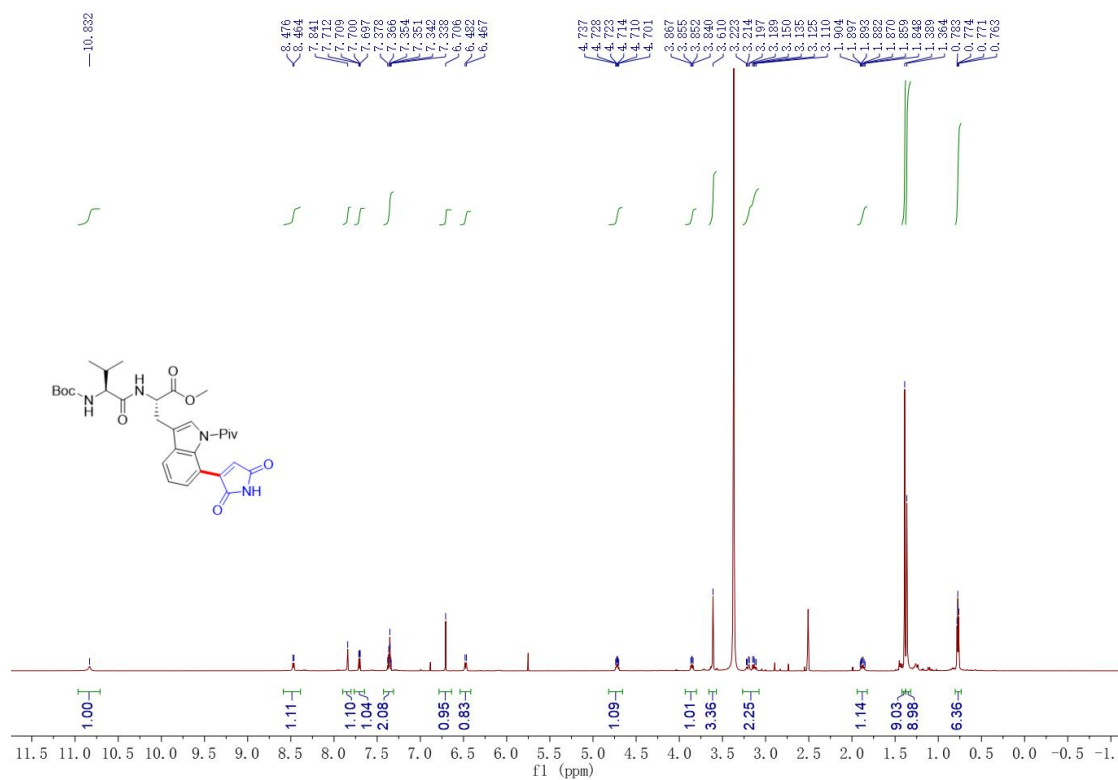
¹³C NMR (151 MHz, CDCl₃) spectrum of **5f**



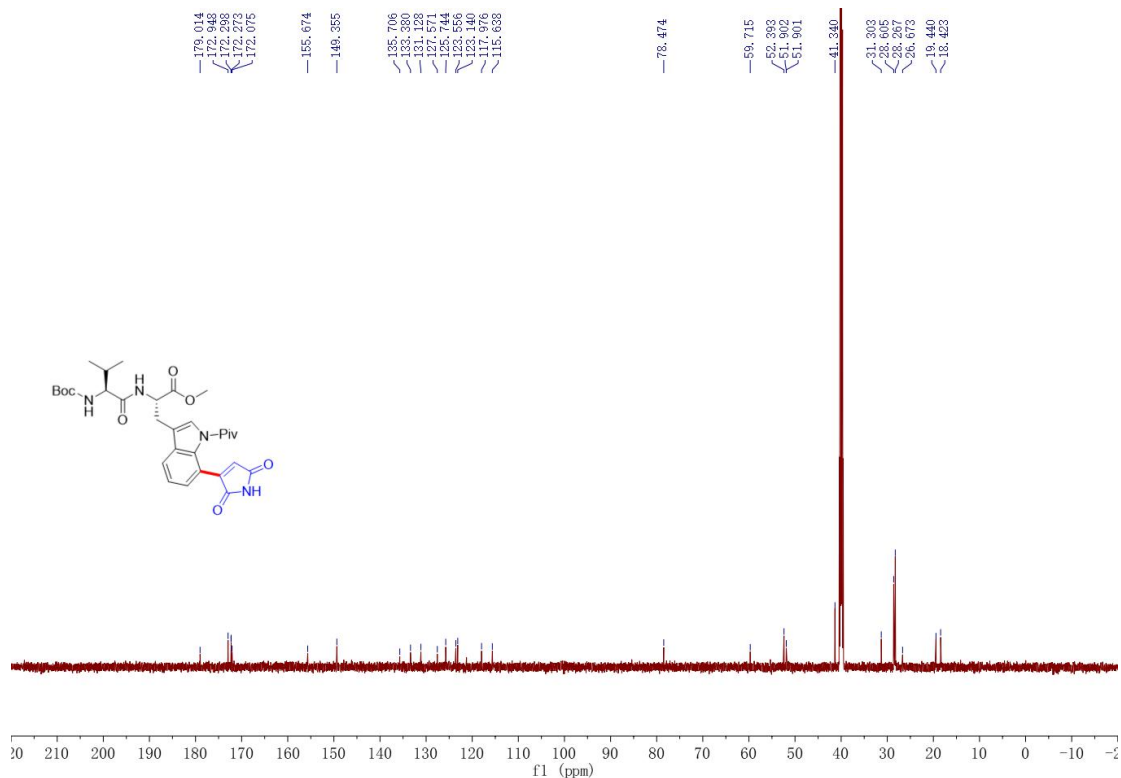
¹H NMR (600 MHz, CDCl₃) spectrum of **5g**



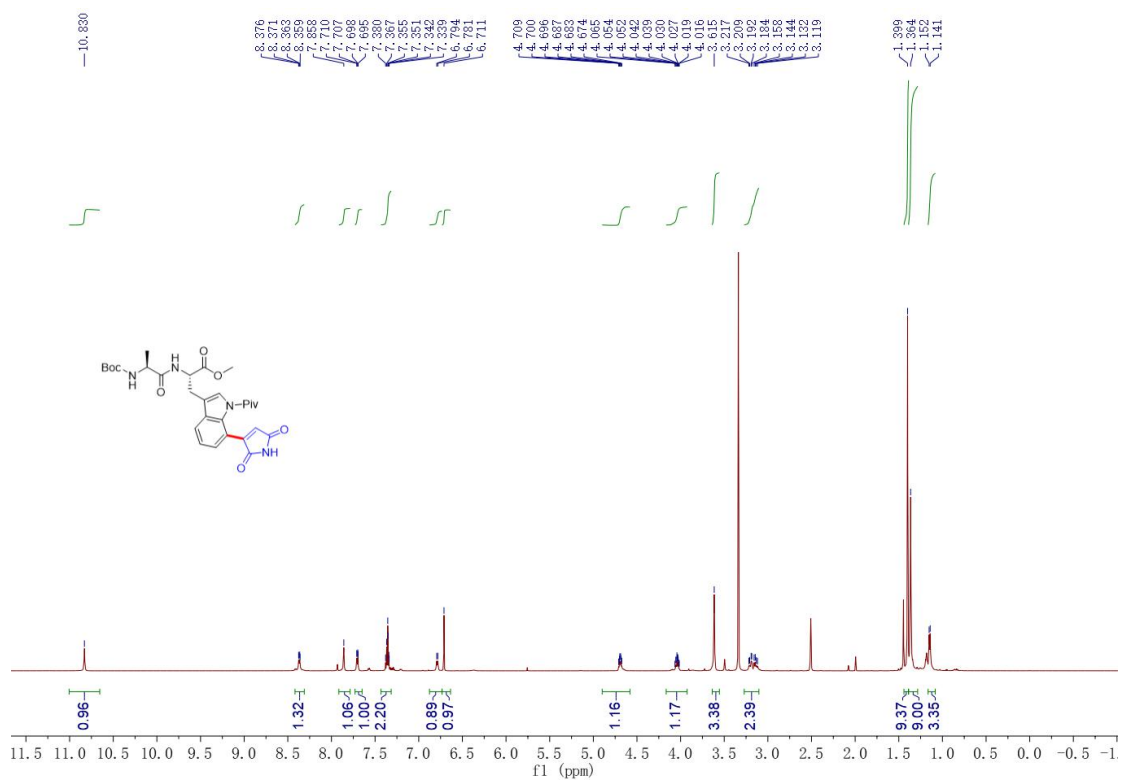
¹³C NMR (151 MHz, CDCl₃) spectrum of **5g**



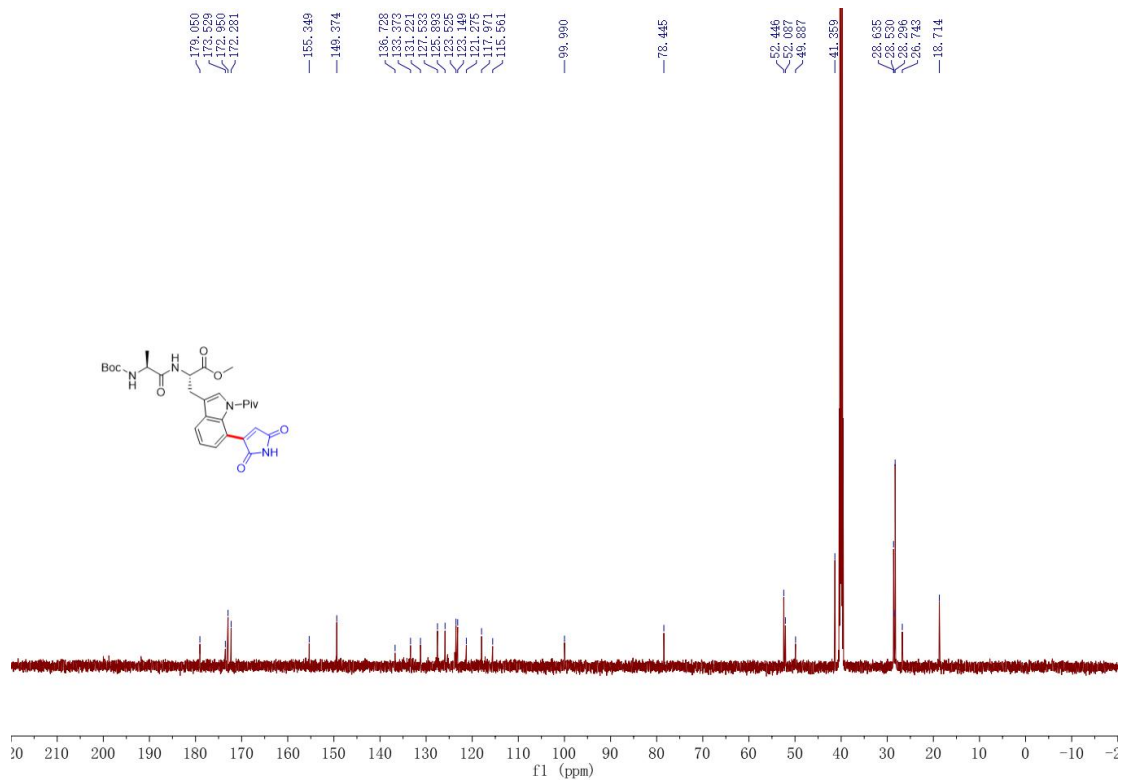
¹H NMR (600 MHz, DMSO) spectrum of **5h**



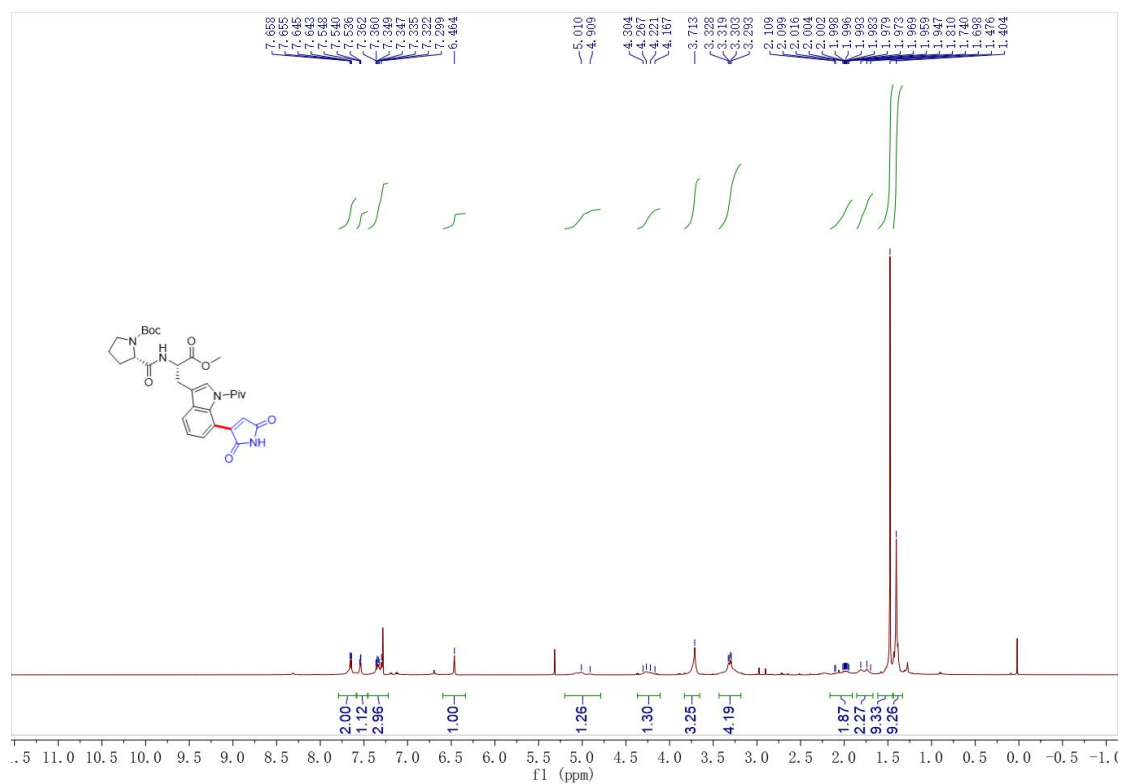
¹³C NMR (151 MHz, DMSO) spectrum of **5h**



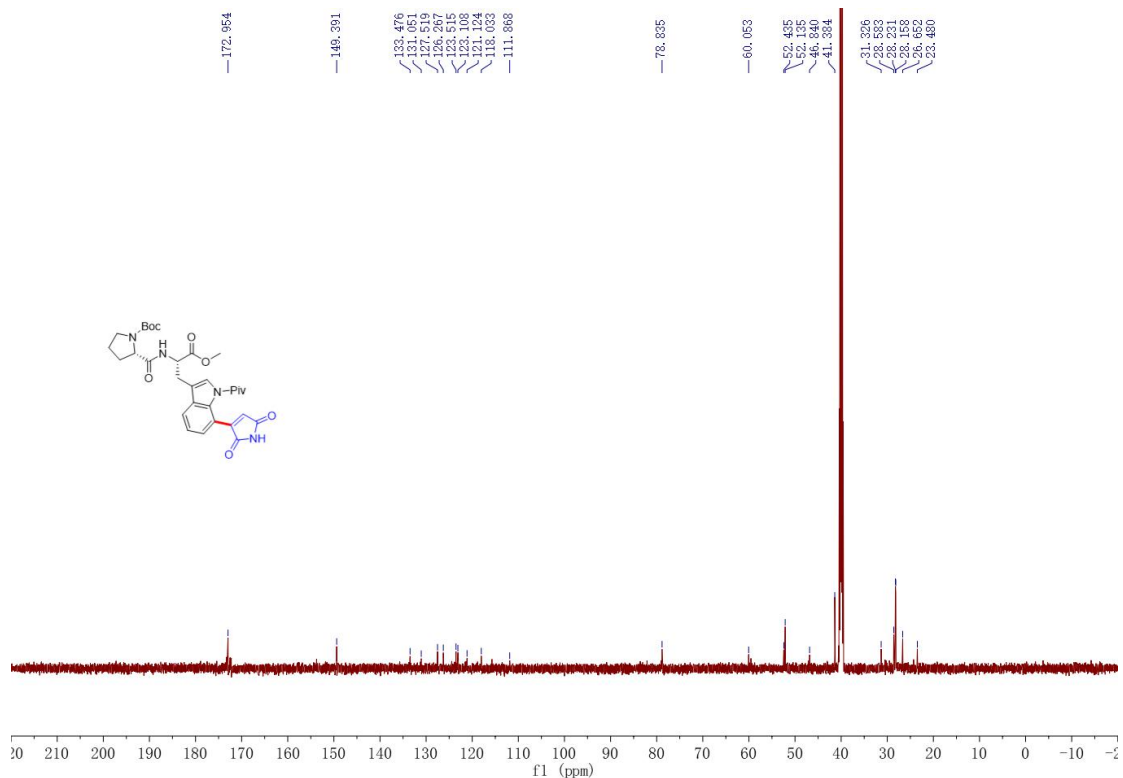
¹H NMR (600 MHz, DMSO) spectrum of **5i**



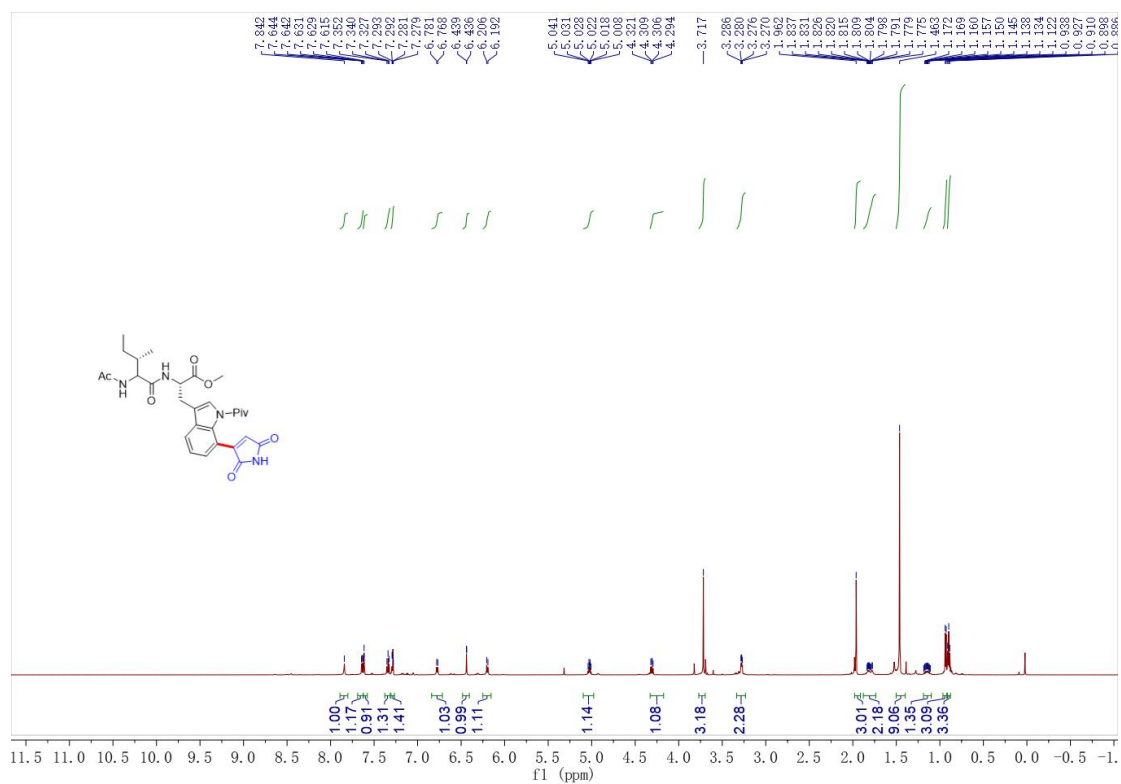
¹³C NMR (151 MHz, DMSO) spectrum of **5i**



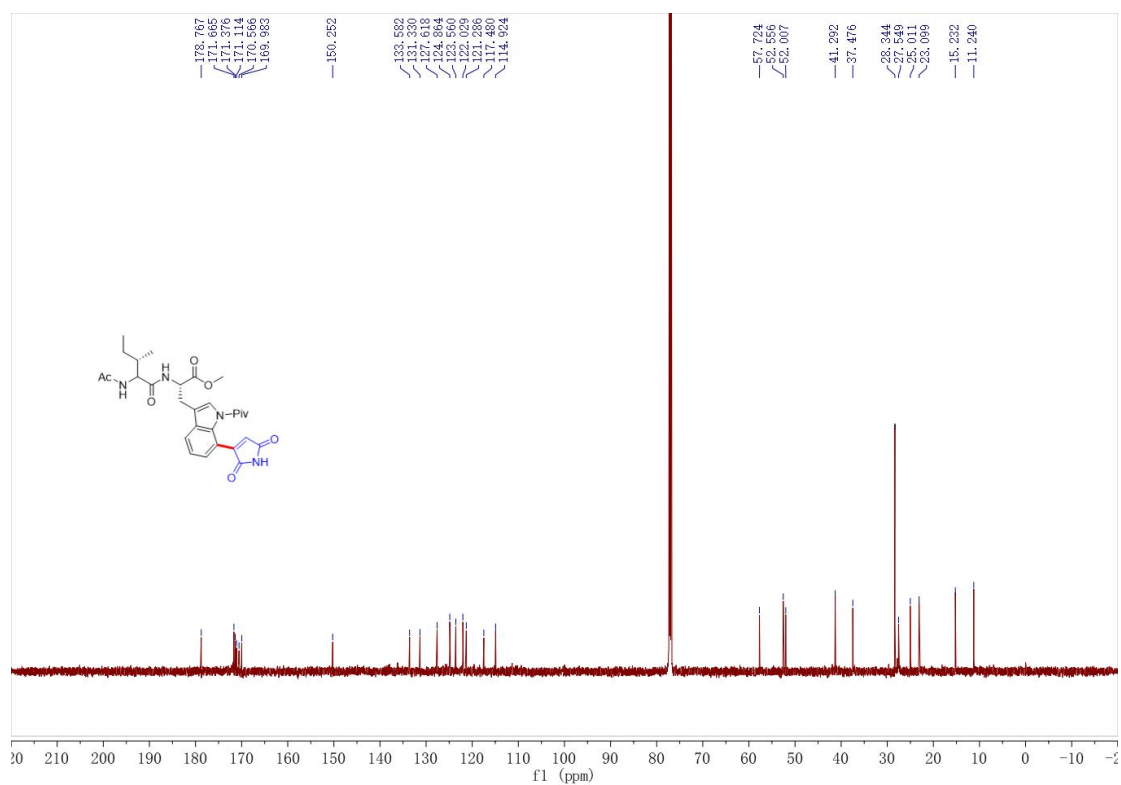
¹H NMR (600 MHz, CDCl₃) spectrum of **5j**



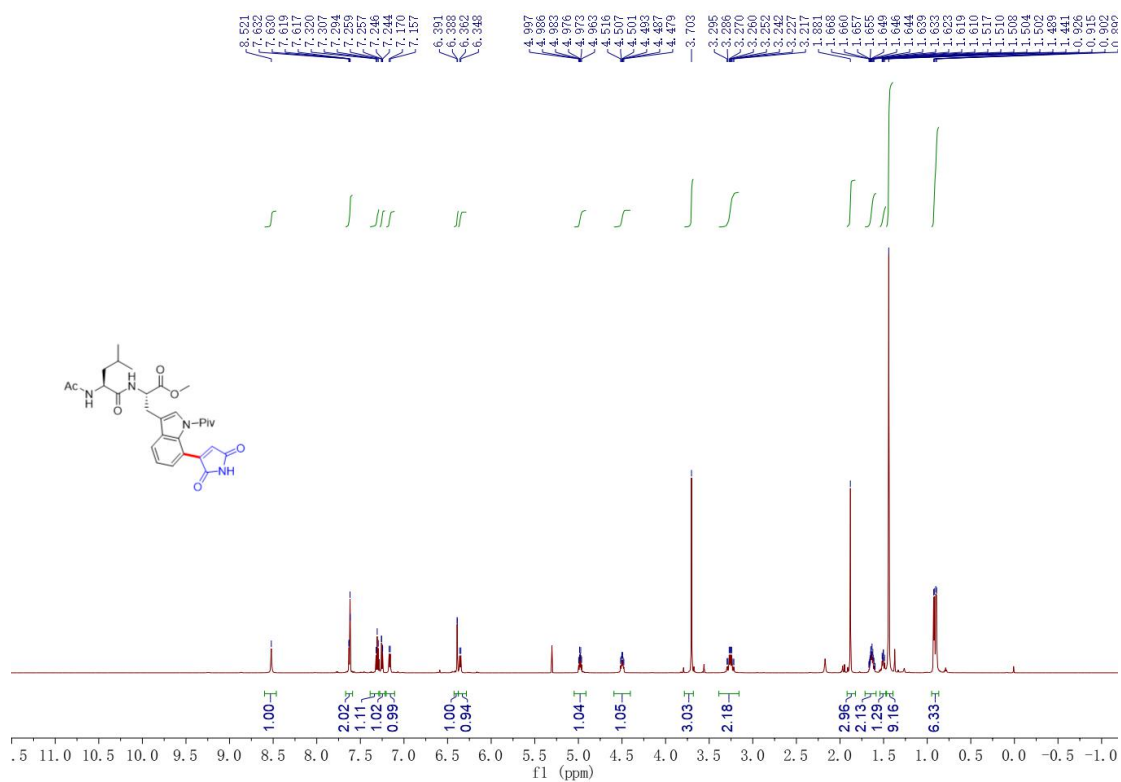
¹³C NMR (151 MHz, DMSO) spectrum of **5j**



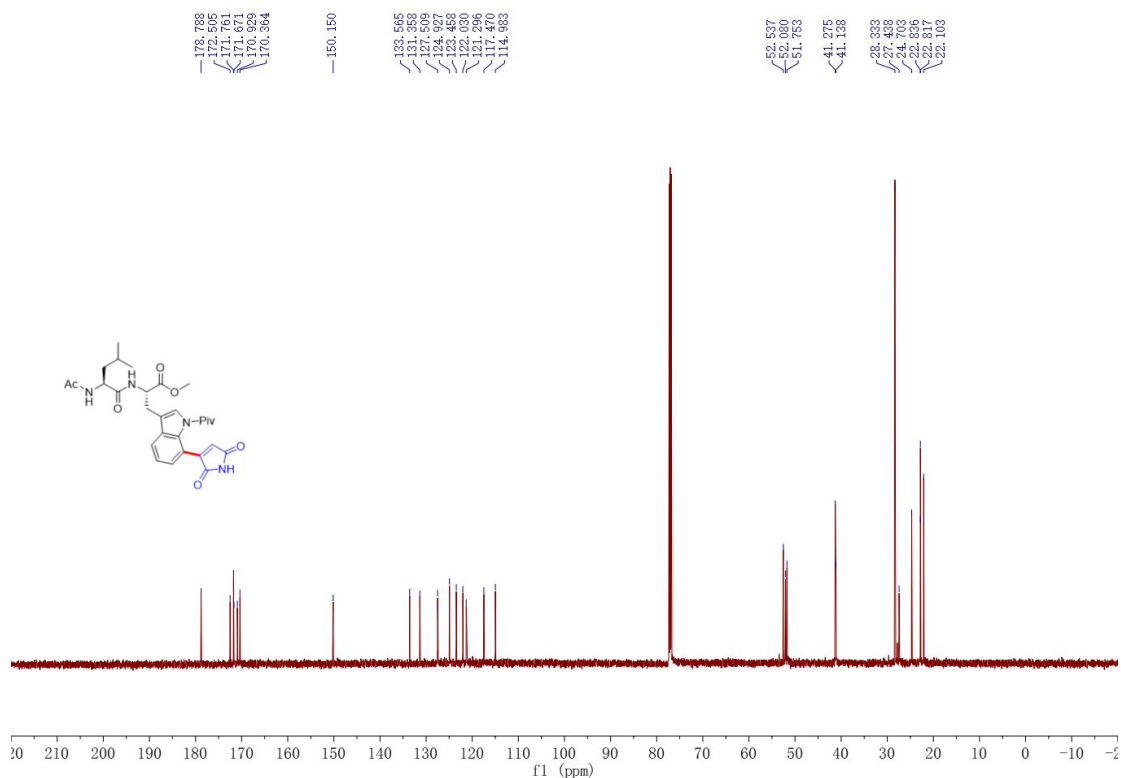
¹H NMR (600 MHz, CDCl₃) spectrum of **5k**



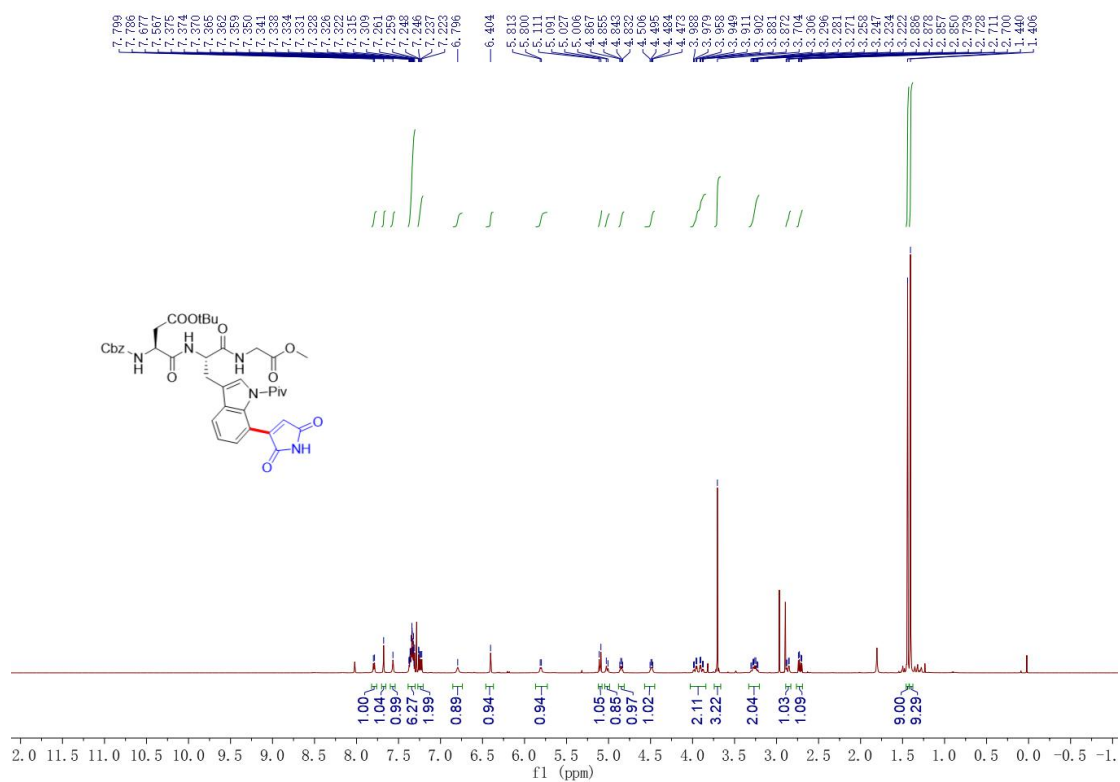
¹³C NMR (151 MHz, CDCl₃) spectrum of **5k**



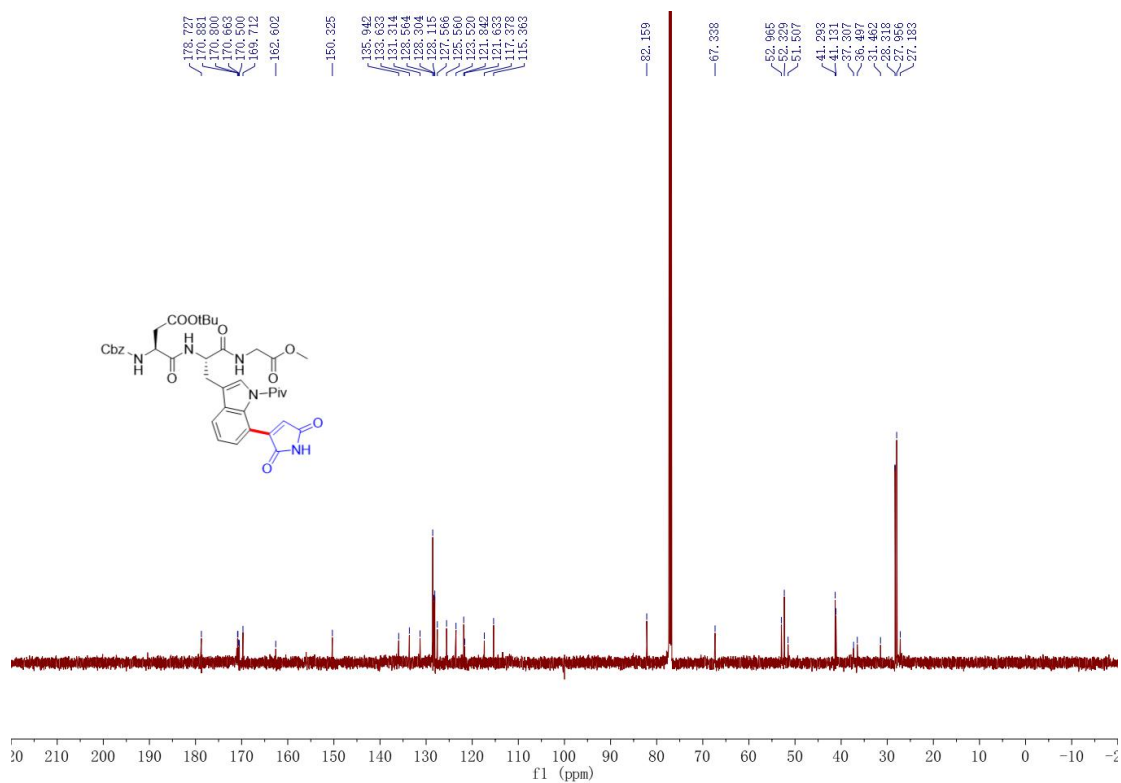
¹H NMR (600 MHz, CDCl₃) spectrum of **5j**



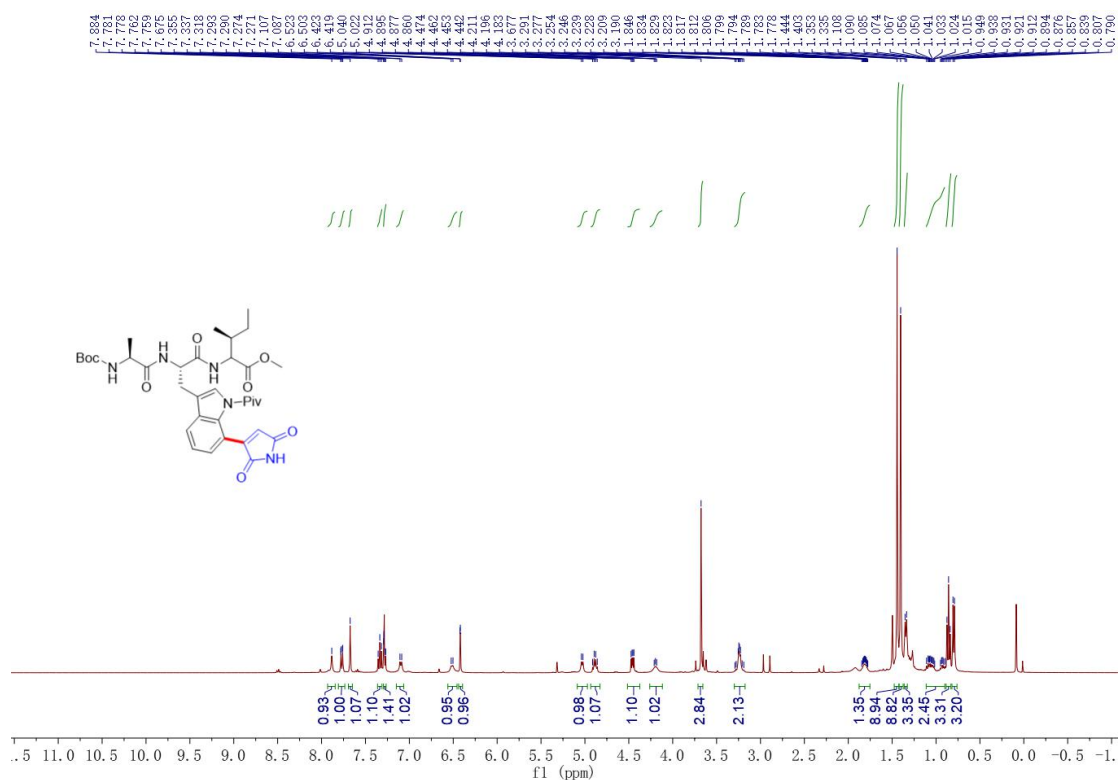
¹³C NMR (151 MHz, CDCl₃) spectrum of **5j**



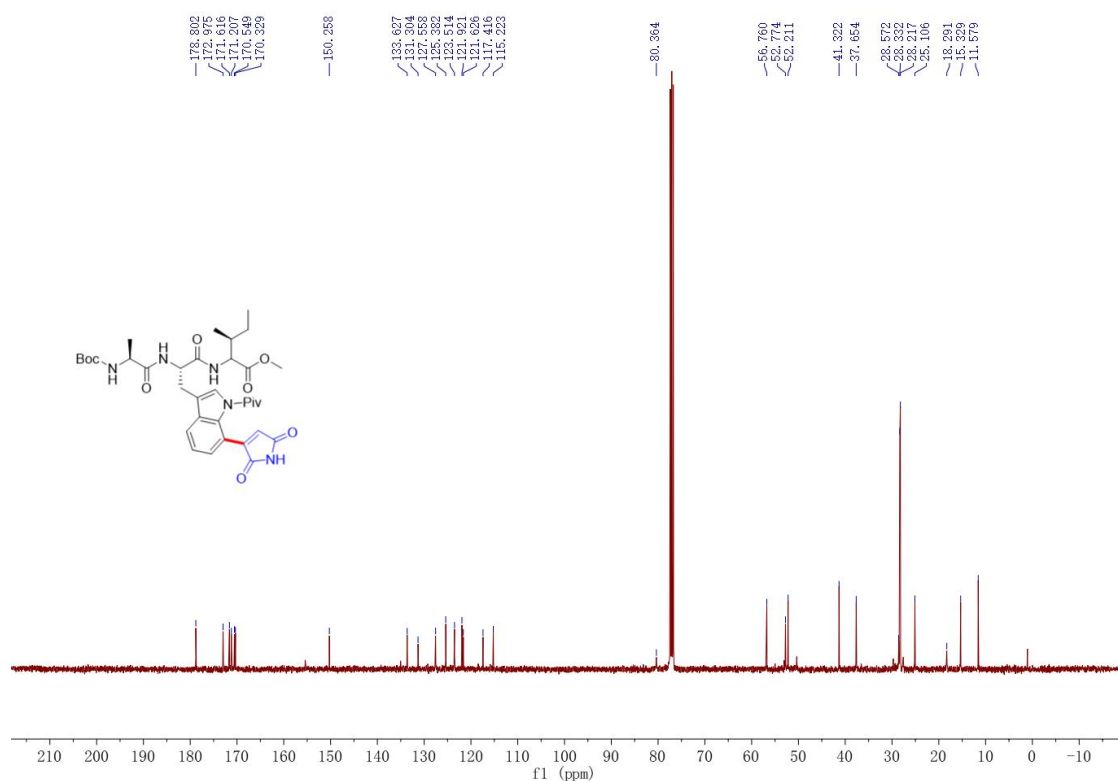
¹H NMR (600 MHz, CDCl₃) spectrum of **5m**



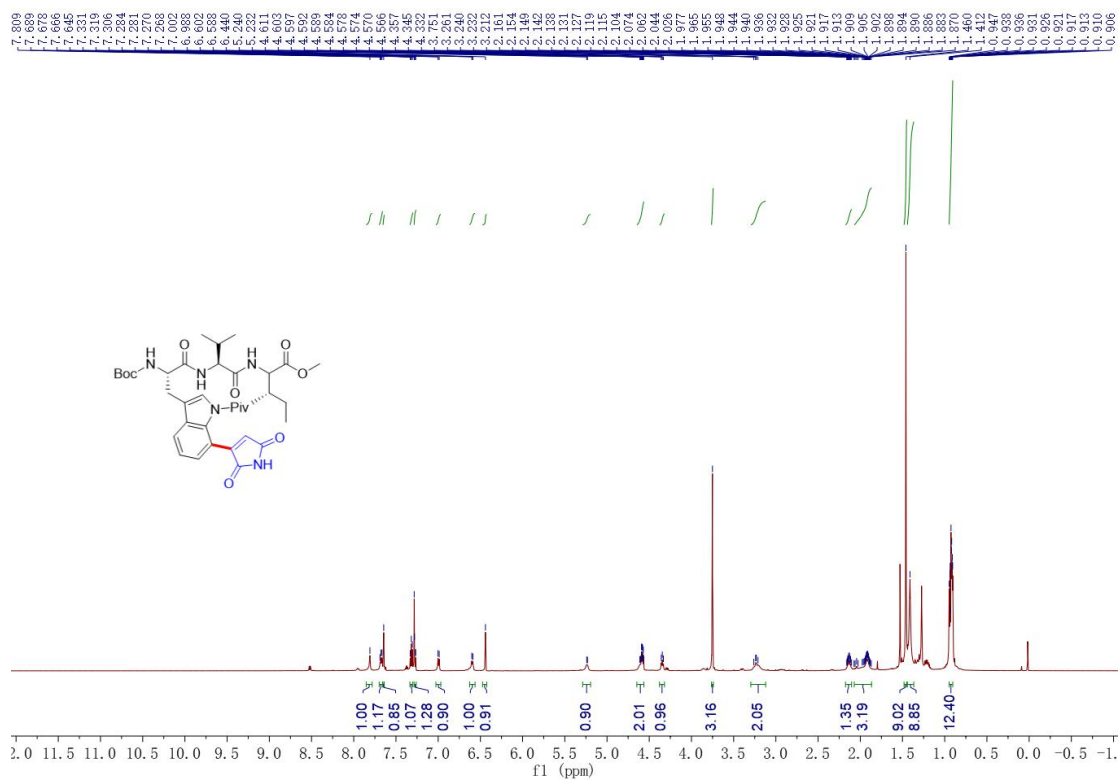
¹³C NMR (151 MHz, CDCl₃) spectrum of **5m**



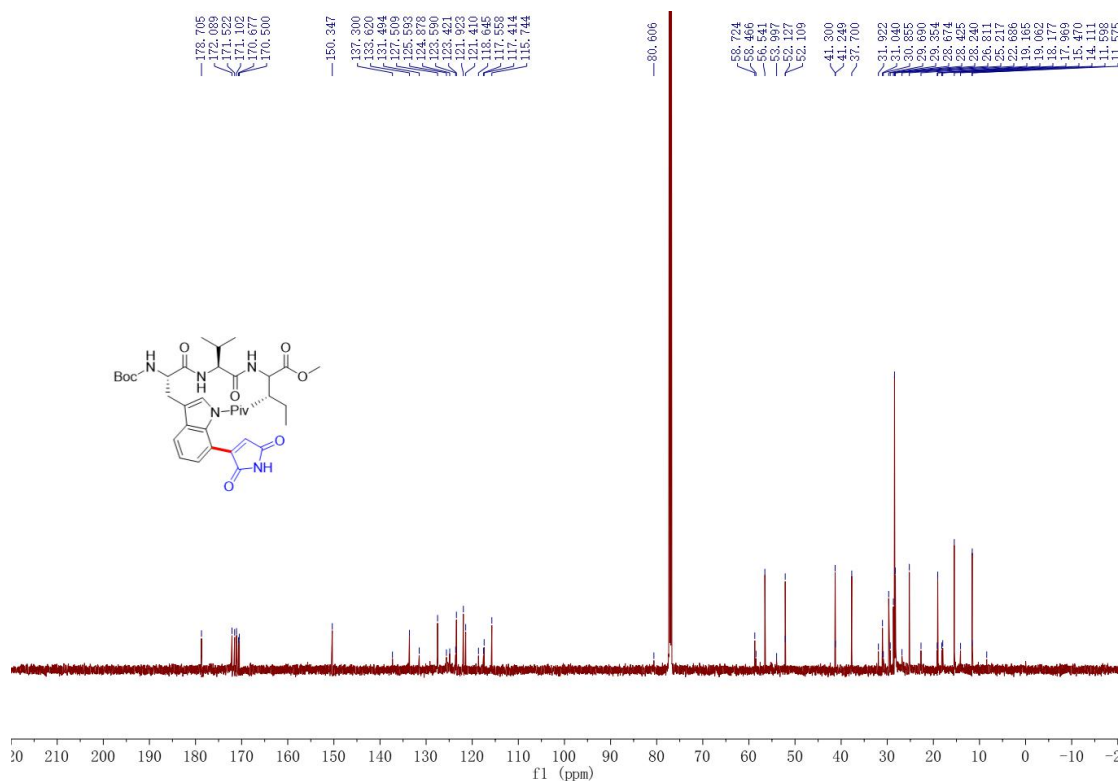
¹H NMR (400 MHz, CDCl₃) spectrum of **5n**



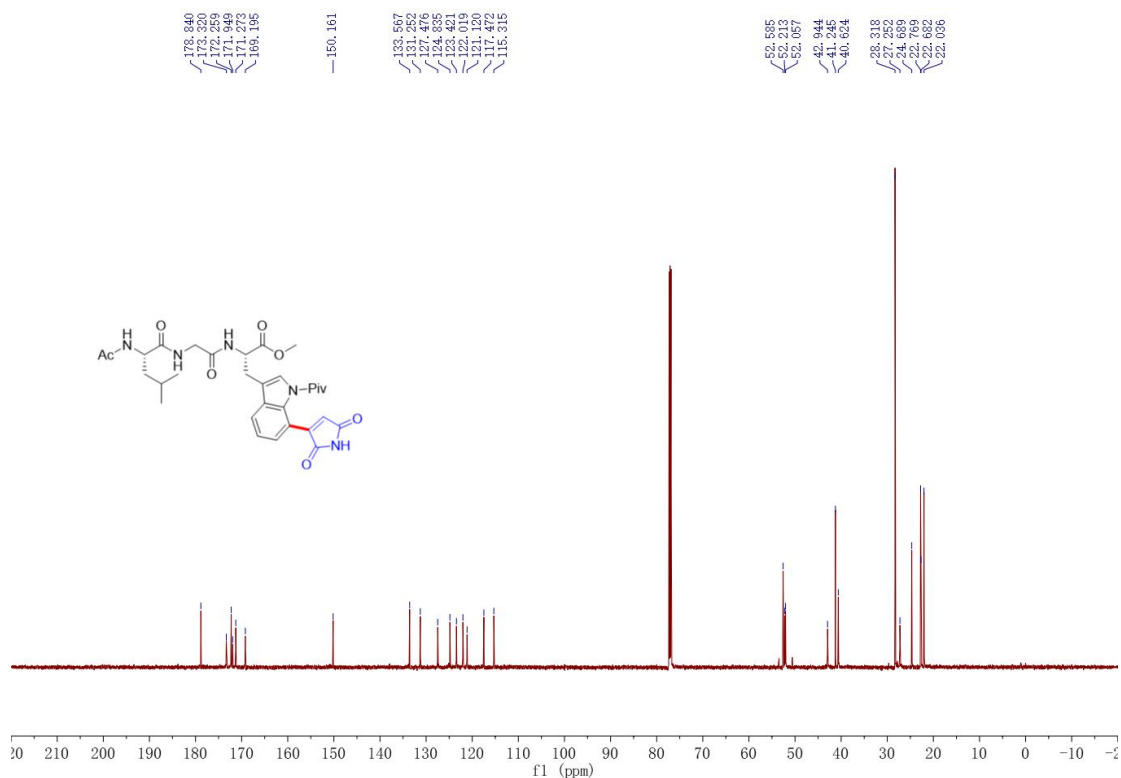
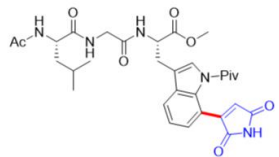
¹³C NMR (101 MHz, CDCl₃) spectrum of **5n**

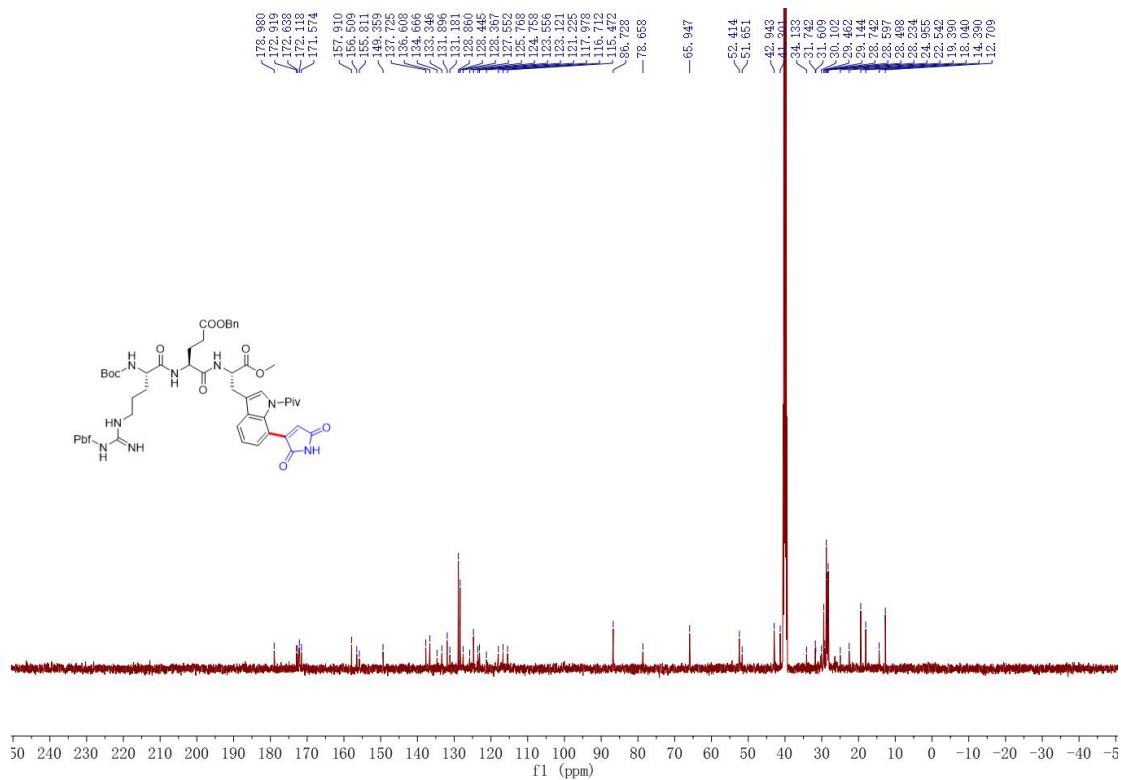
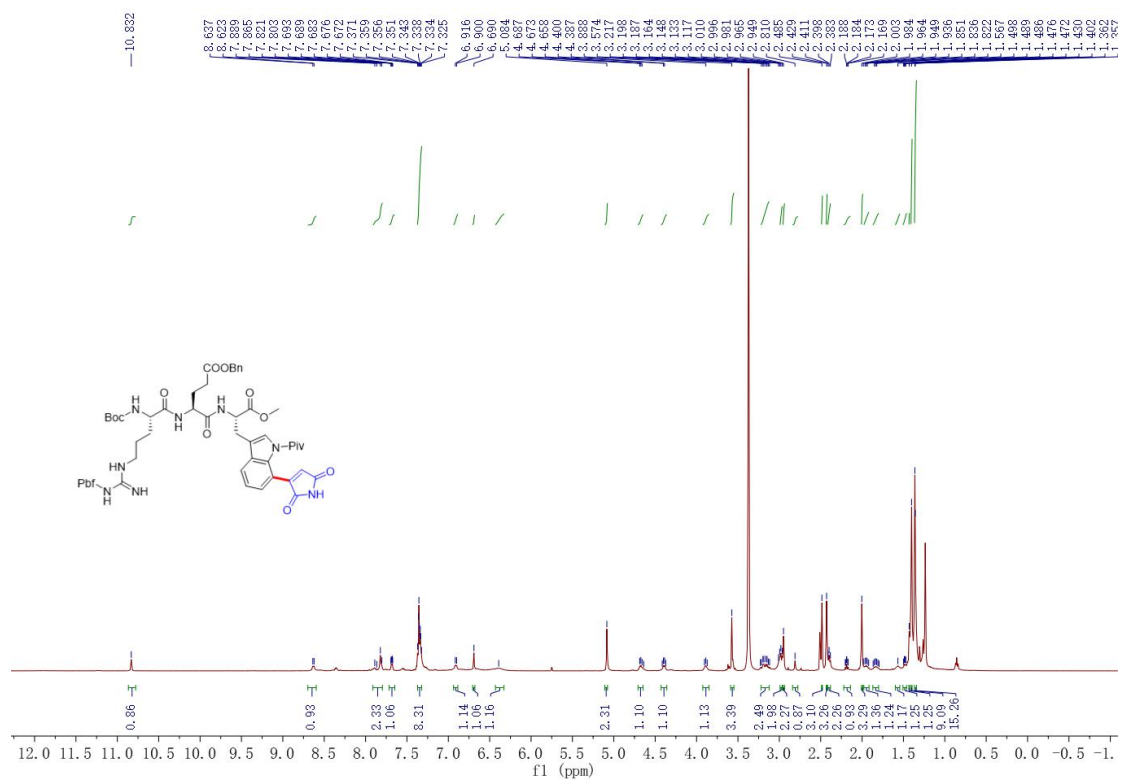


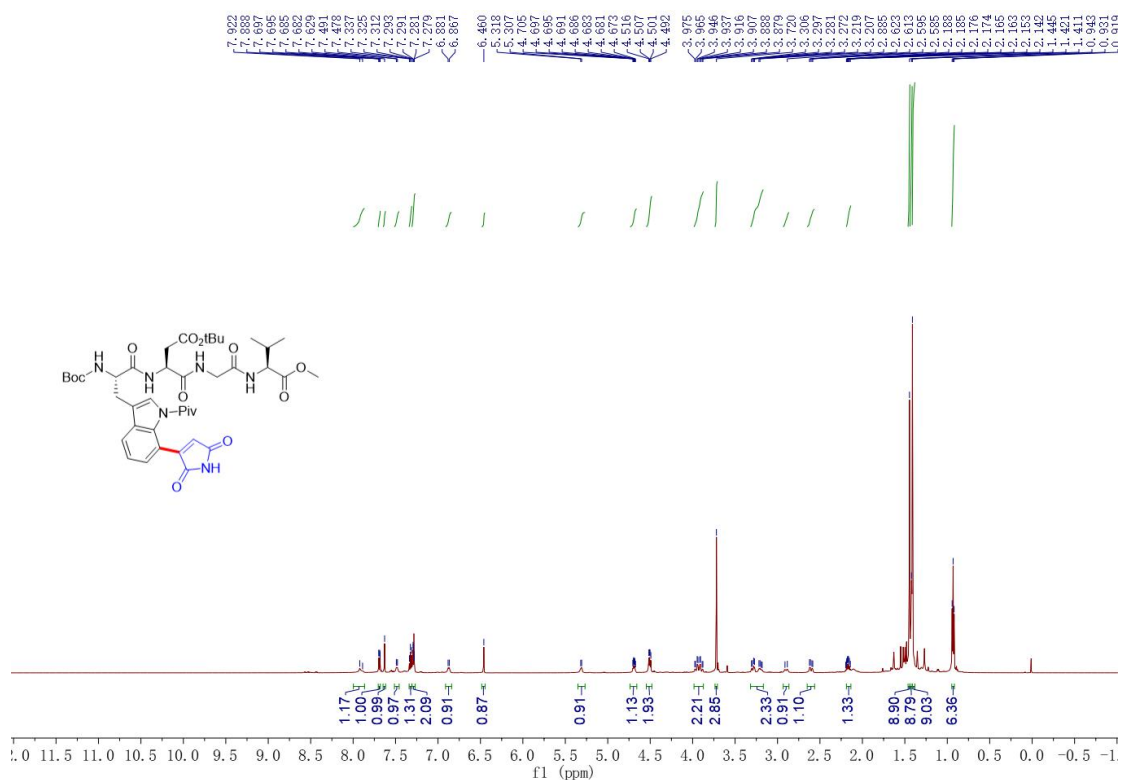
^1H NMR (600 MHz, CDCl_3) spectrum of **5p**



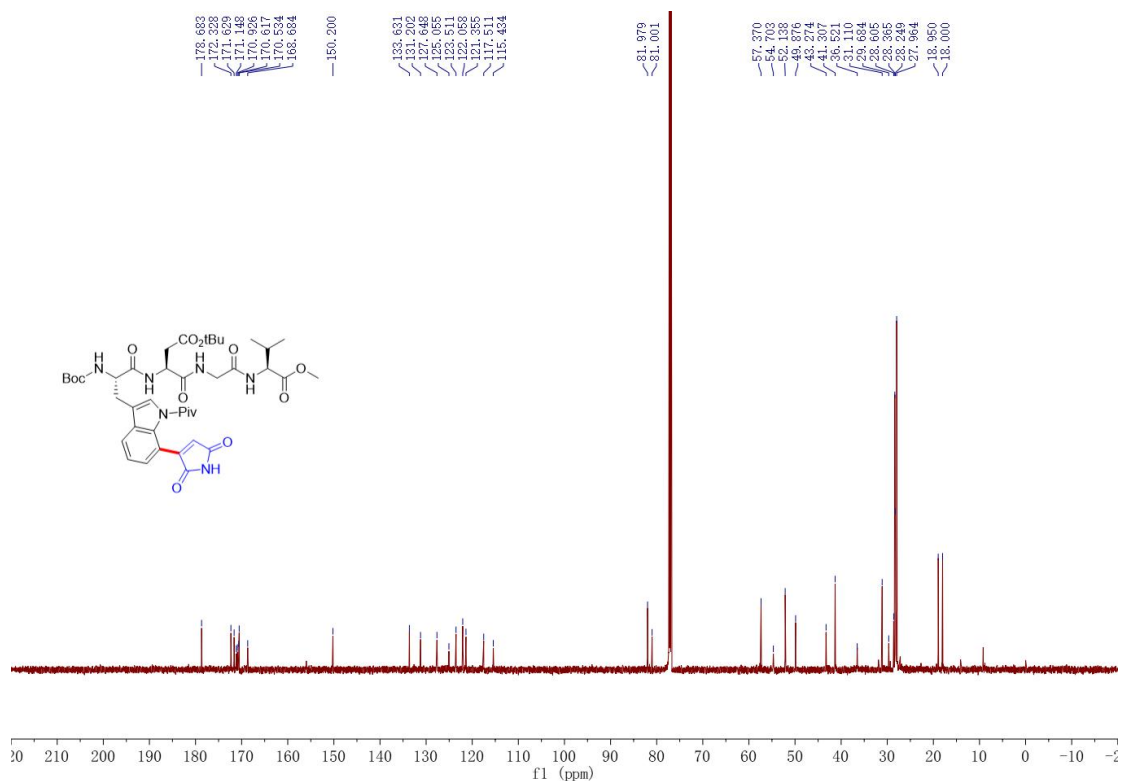
^{13}C NMR (151 MHz, CDCl_3) spectrum of **5p**



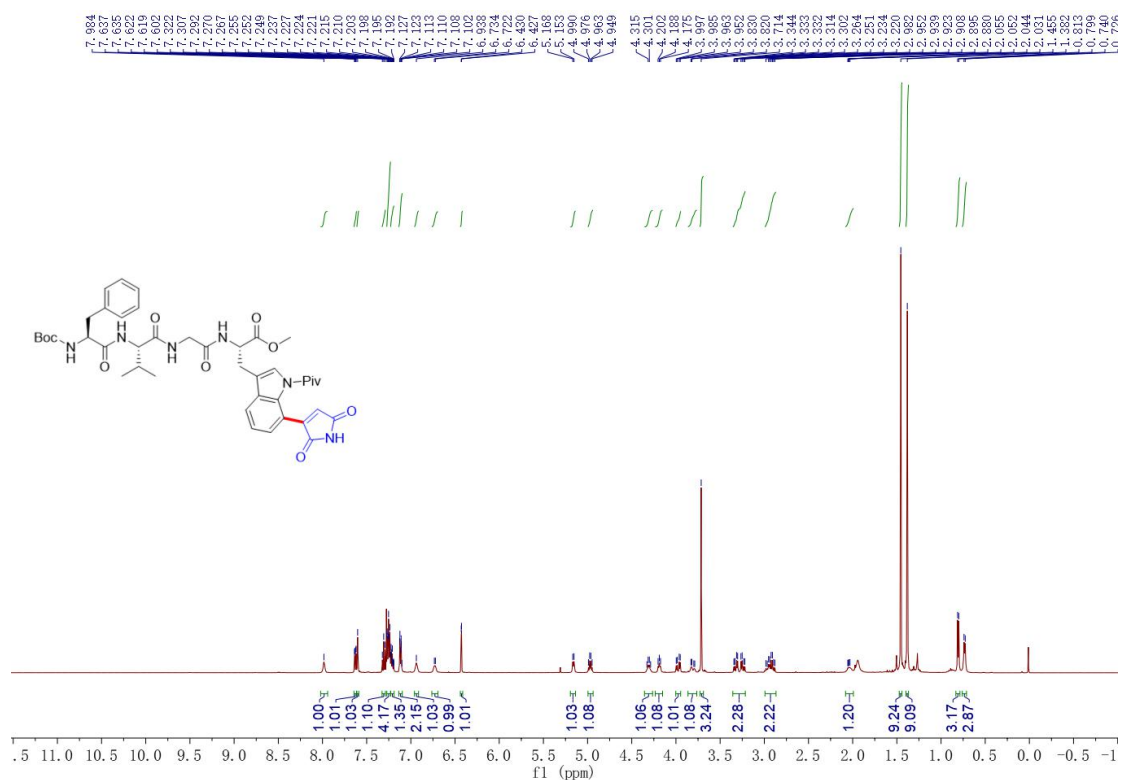




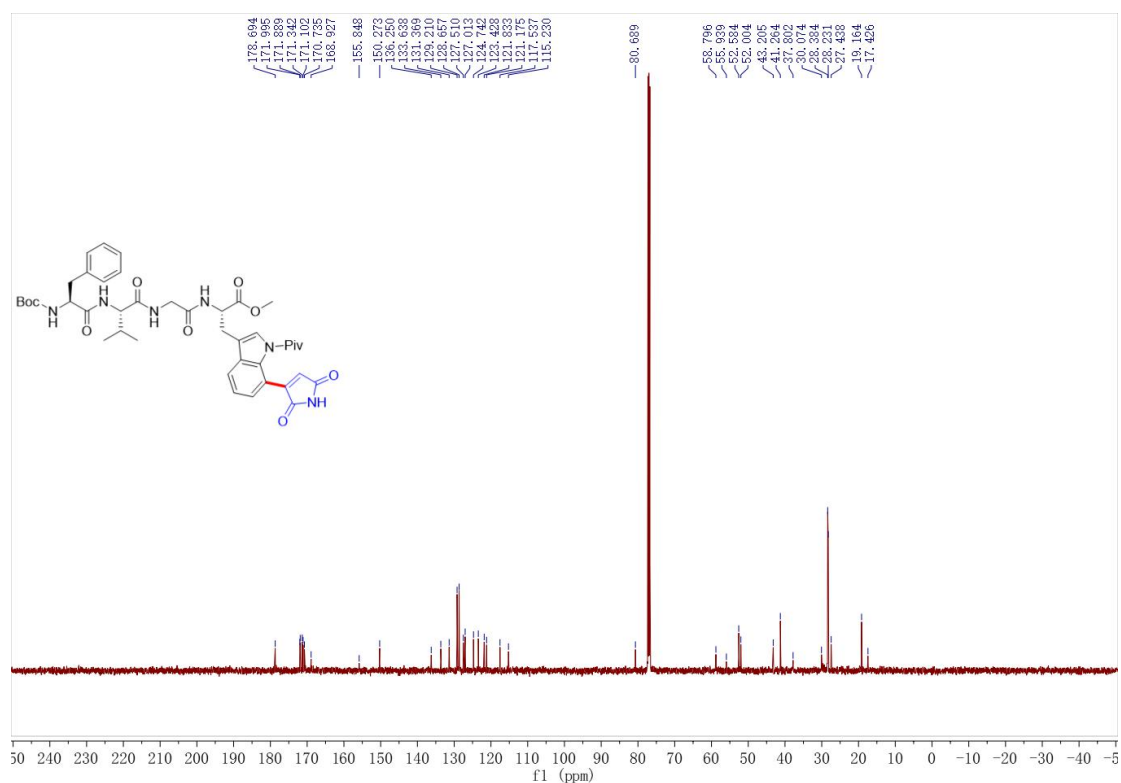
¹H NMR (600 MHz, CDCl₃) spectrum of **5t**



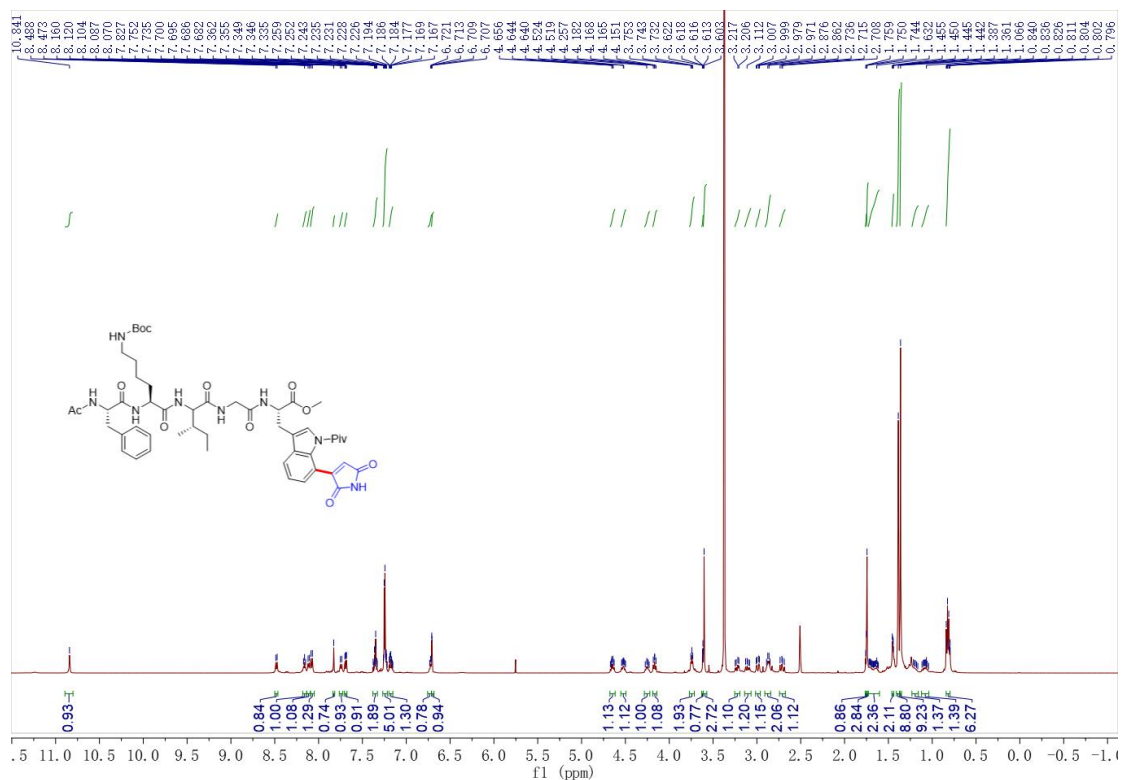
¹³C NMR (151 MHz, CDCl₃) spectrum of **5t**



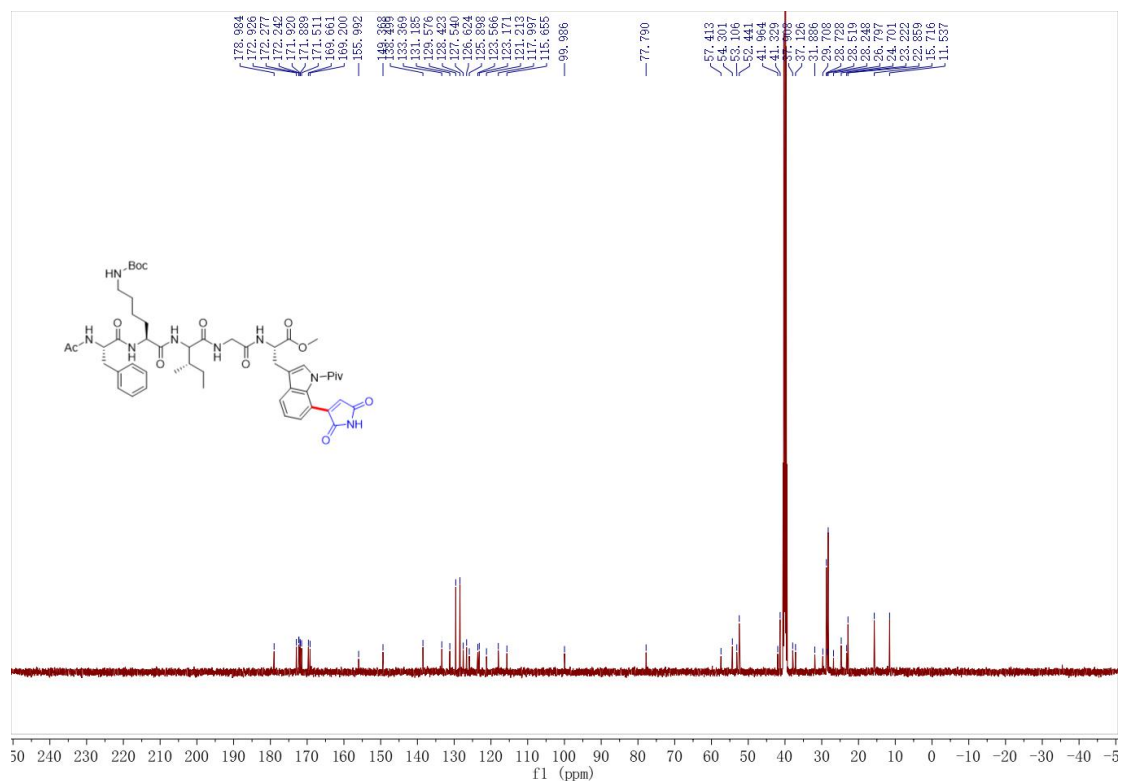
¹H NMR (500 MHz, CDCl₃) spectrum of **5u**



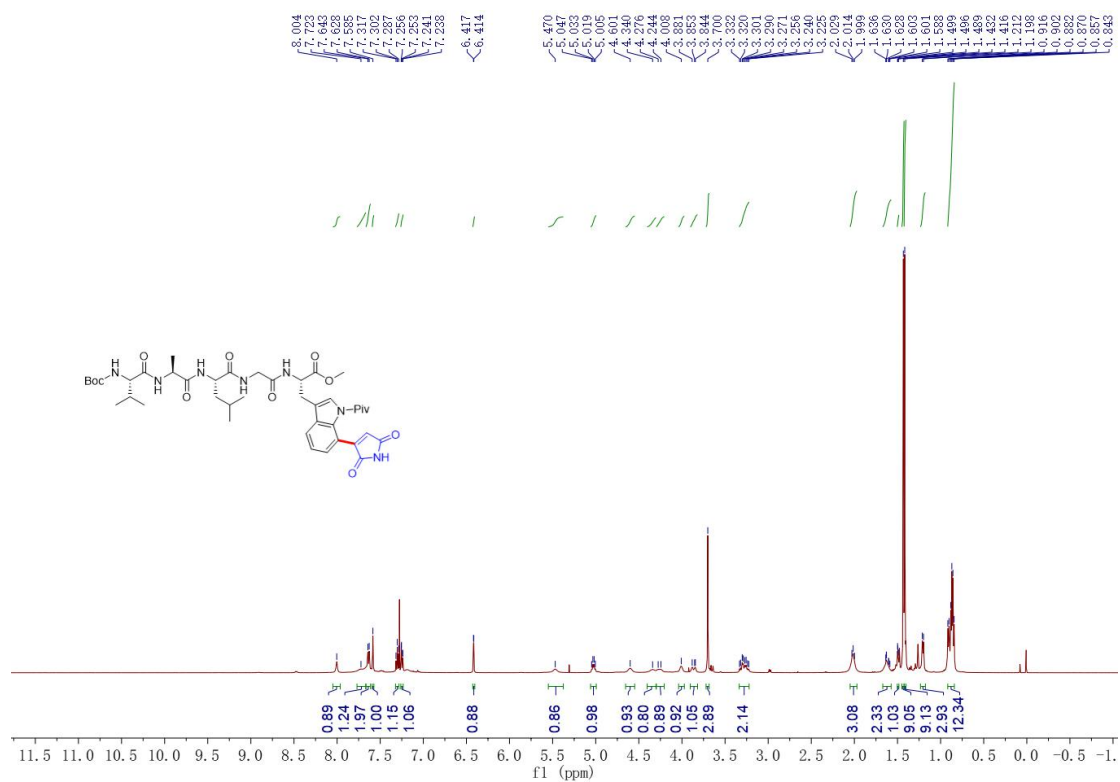
¹³C NMR (126 MHz, CDCl₃) spectrum of **5u**



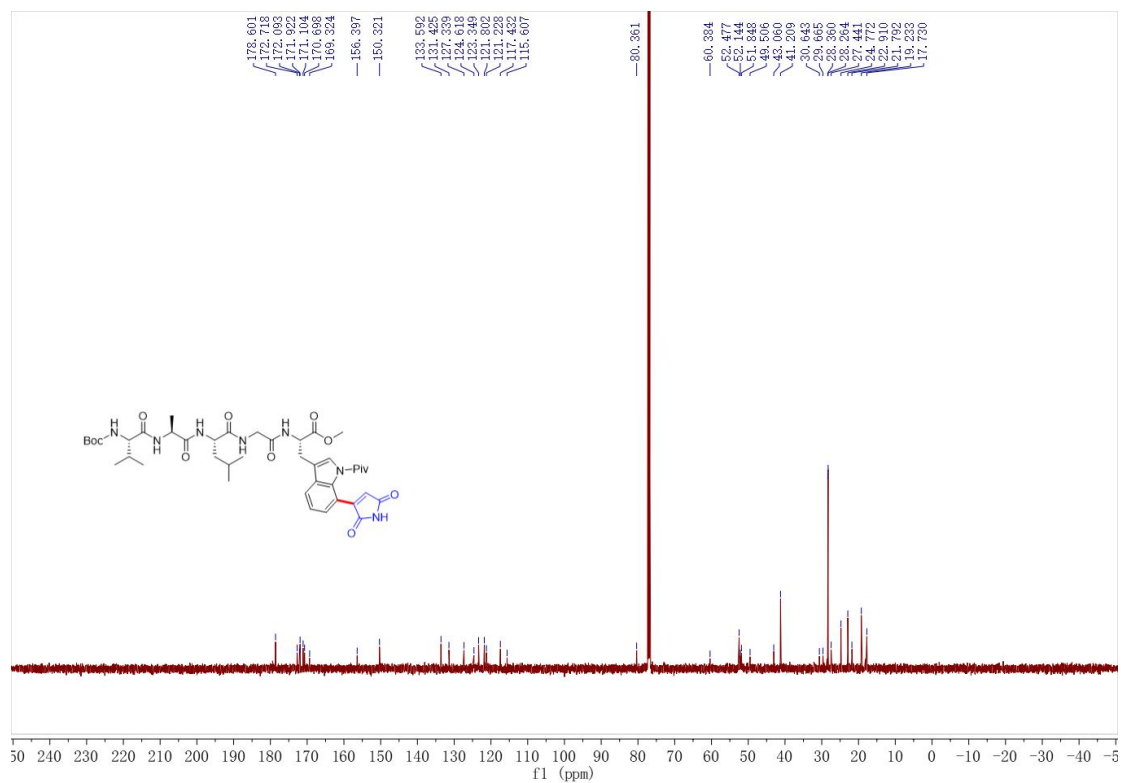
¹H NMR (500 MHz, DMSO) spectrum of **5v**



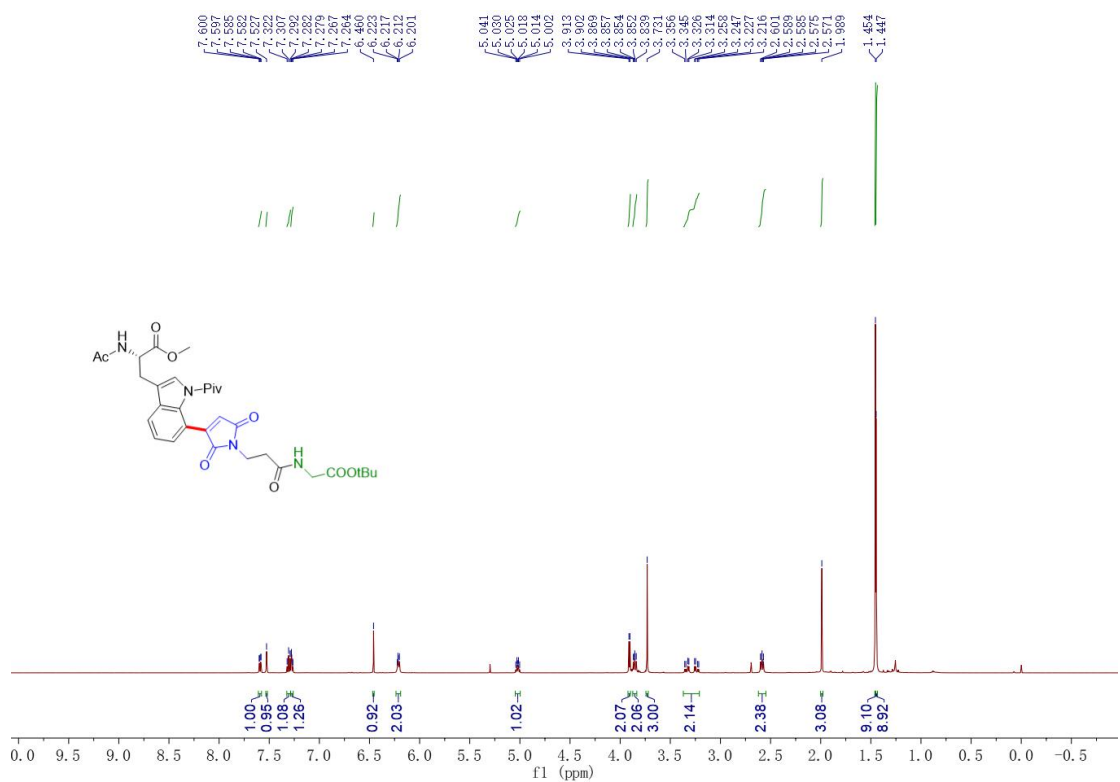
¹³C NMR (126 MHz, DMSO) spectrum of **5v**



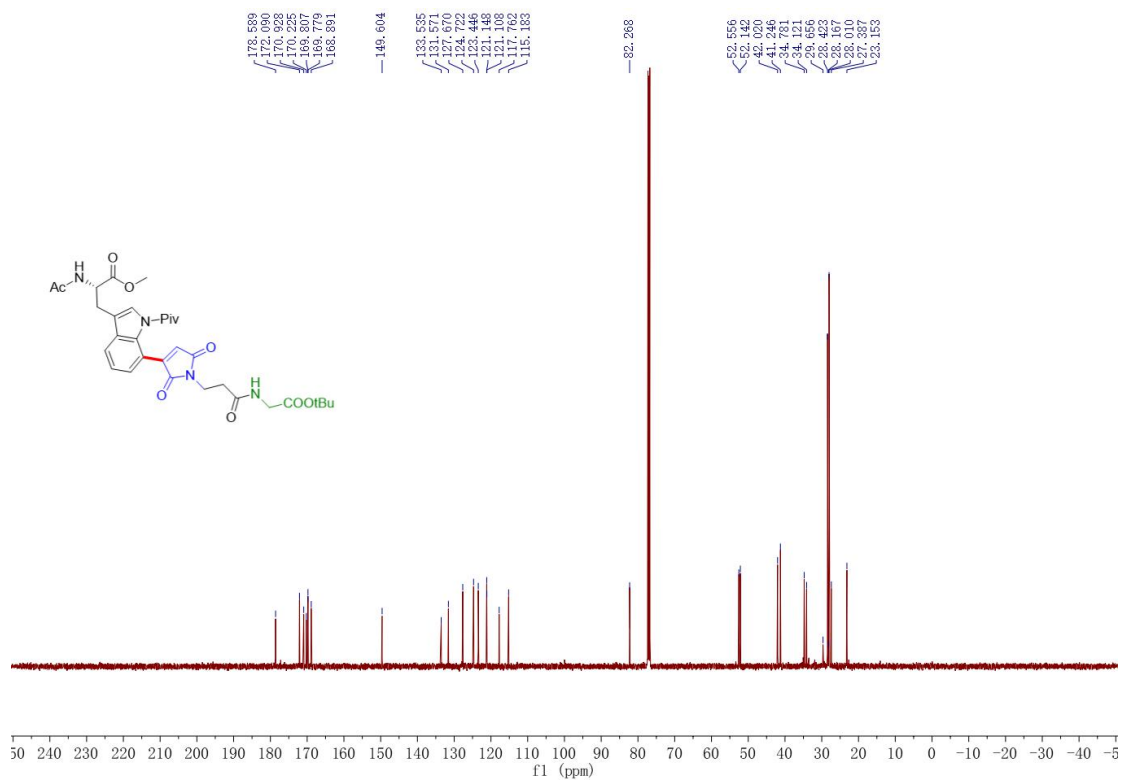
¹H NMR (500 MHz, CDCl₃) spectrum of **5w**



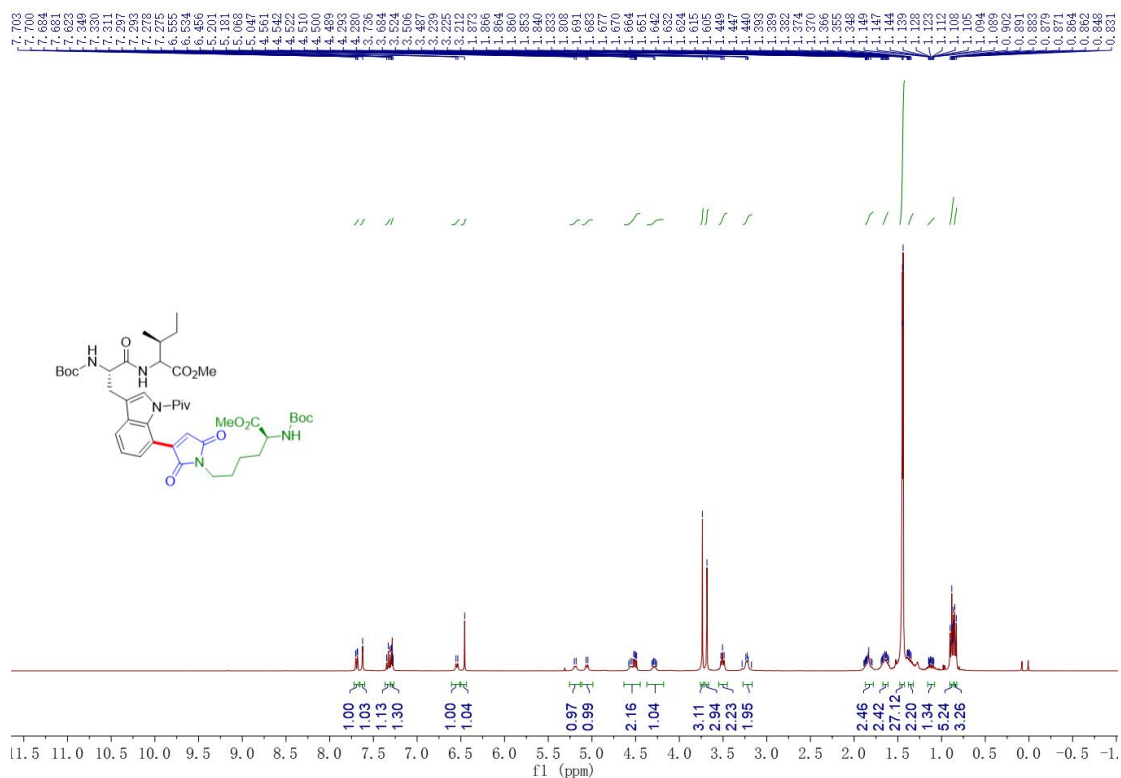
¹³C NMR (126 MHz, CDCl₃) spectrum of **5w**



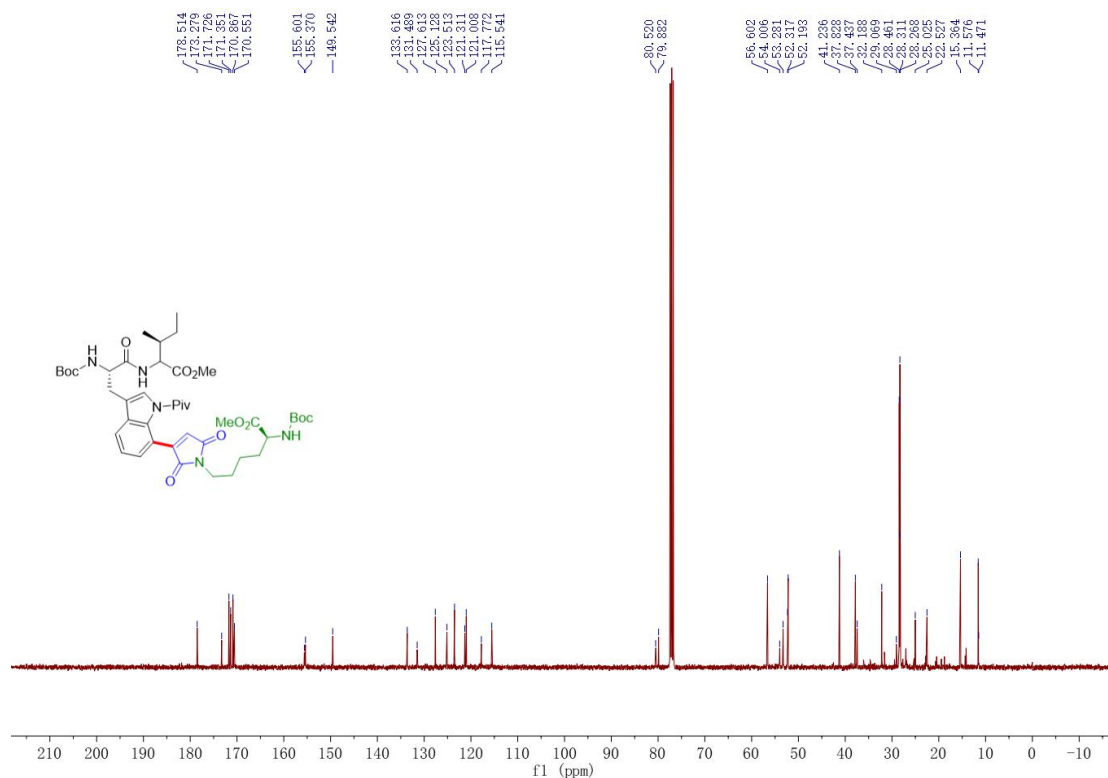
¹H NMR (500 MHz, CDCl₃) spectrum of 7a



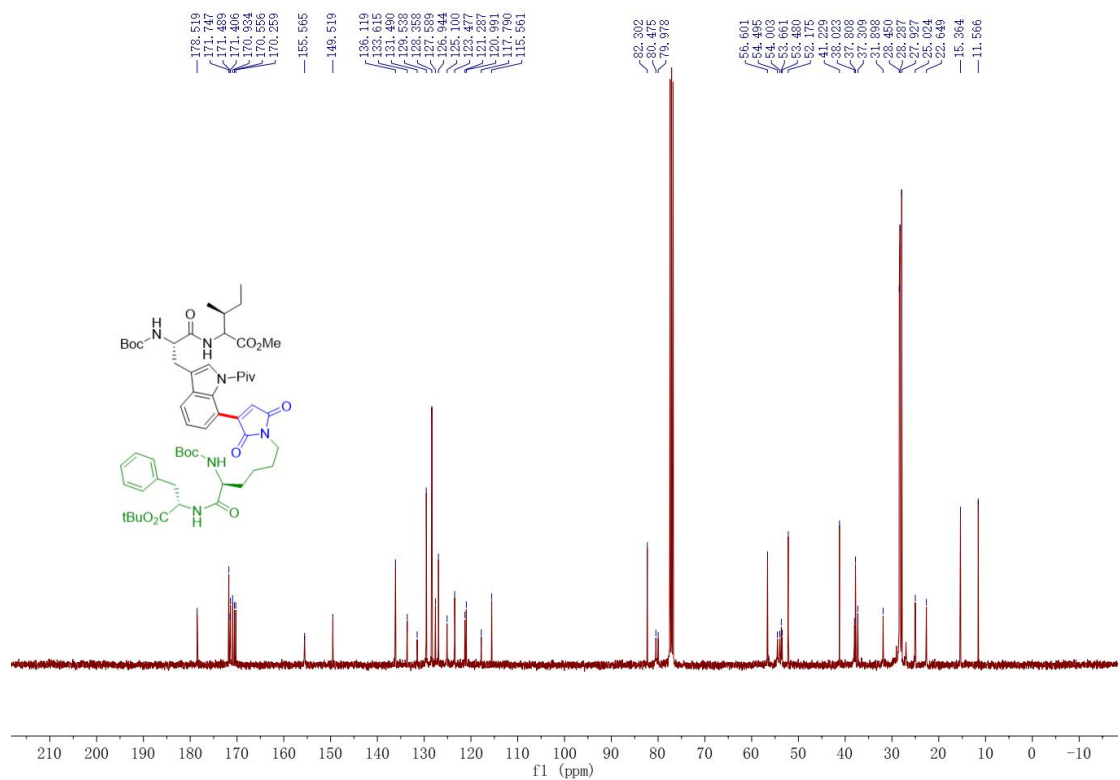
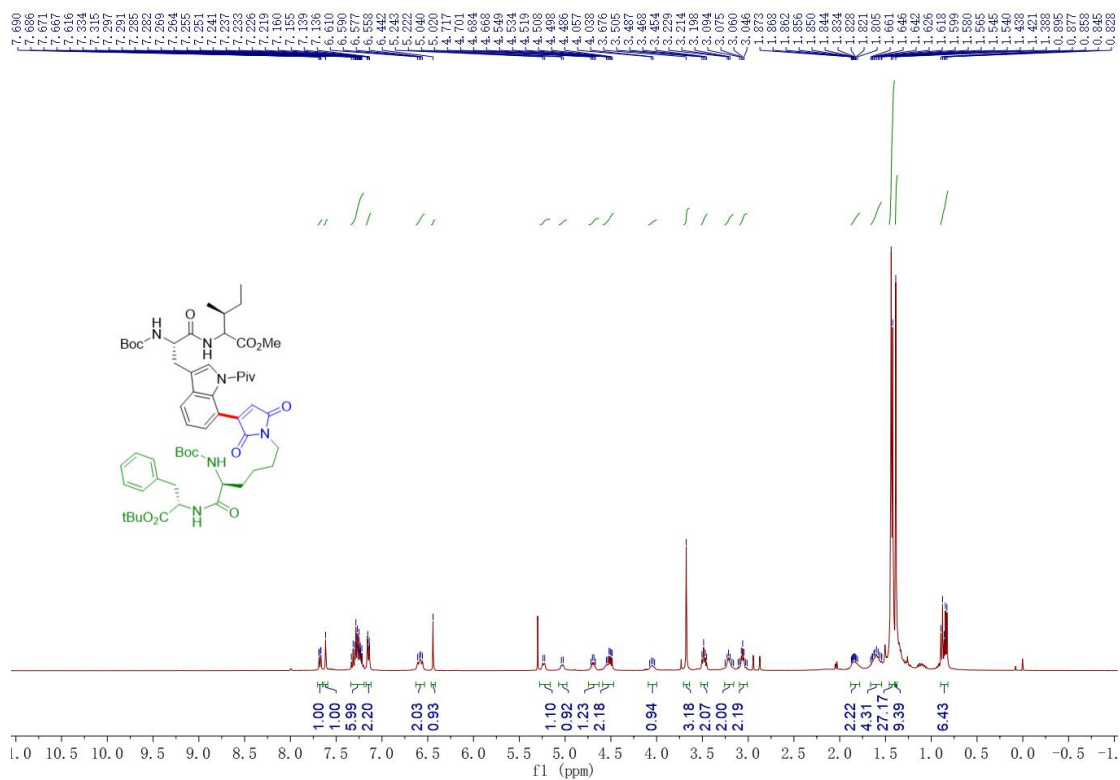
¹³C NMR (126 MHz, CDCl₃) spectrum of 7a

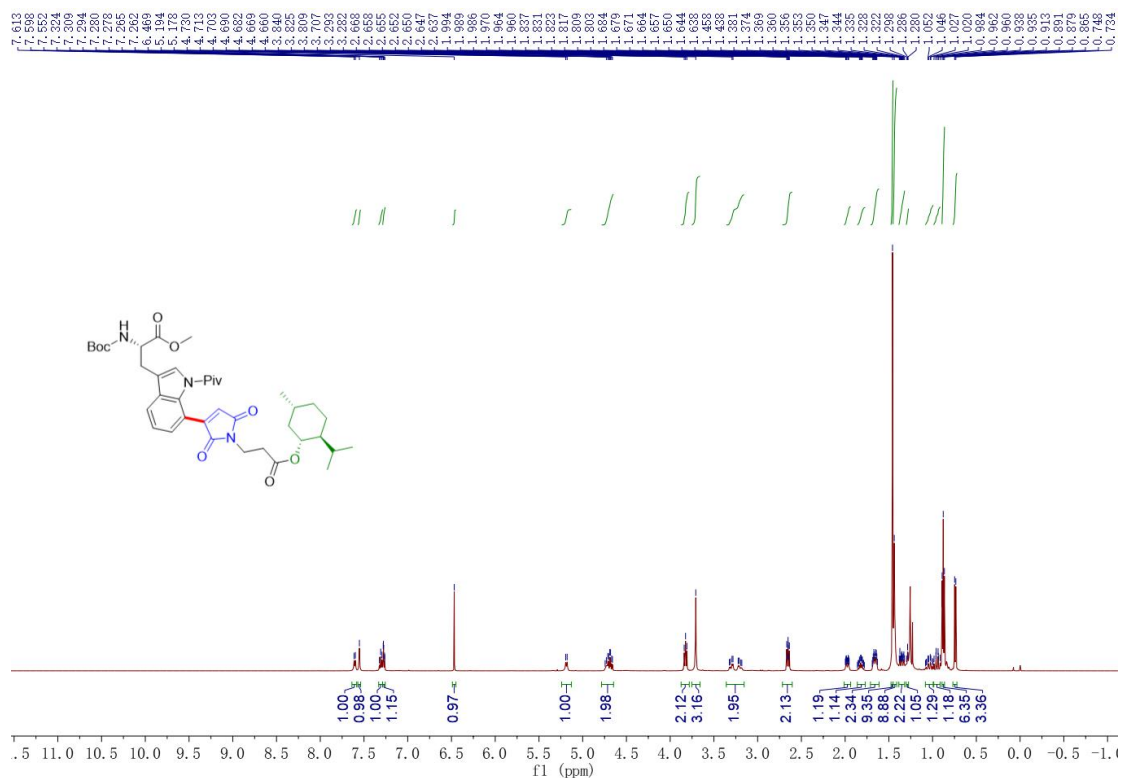


¹H NMR (400 MHz, CDCl₃) spectrum of **7b**

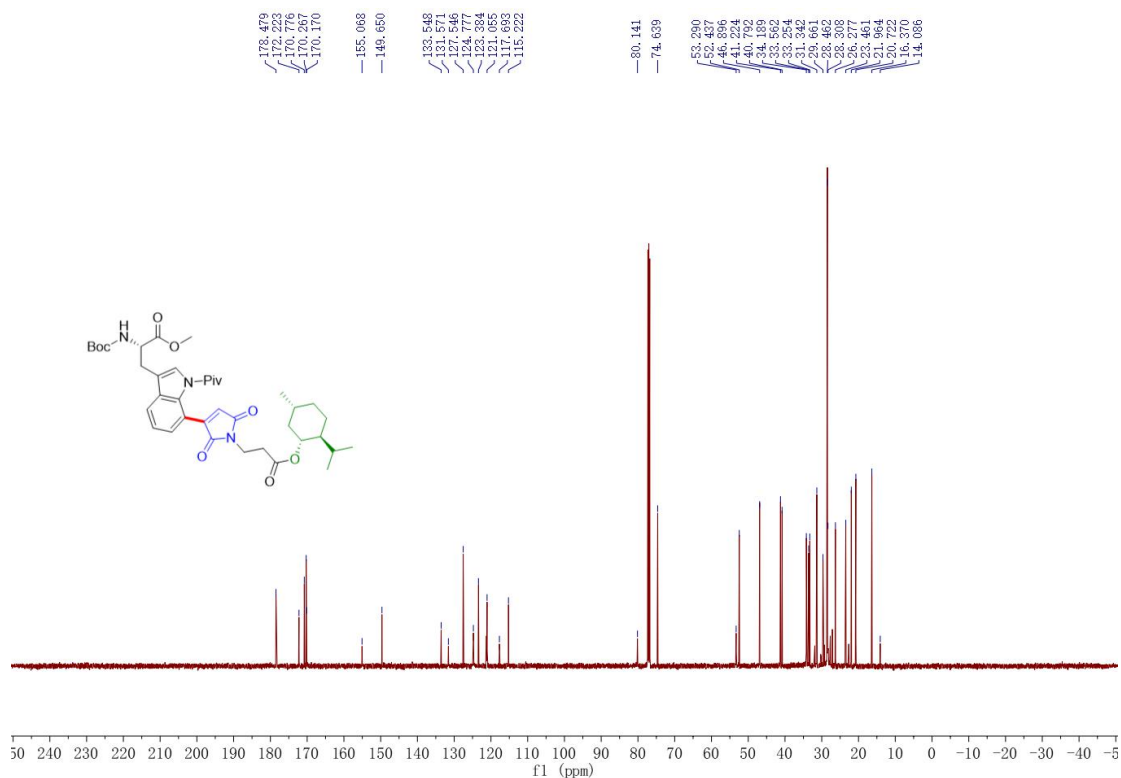


¹³C NMR (101 MHz, CDCl₃) spectrum of **7b**

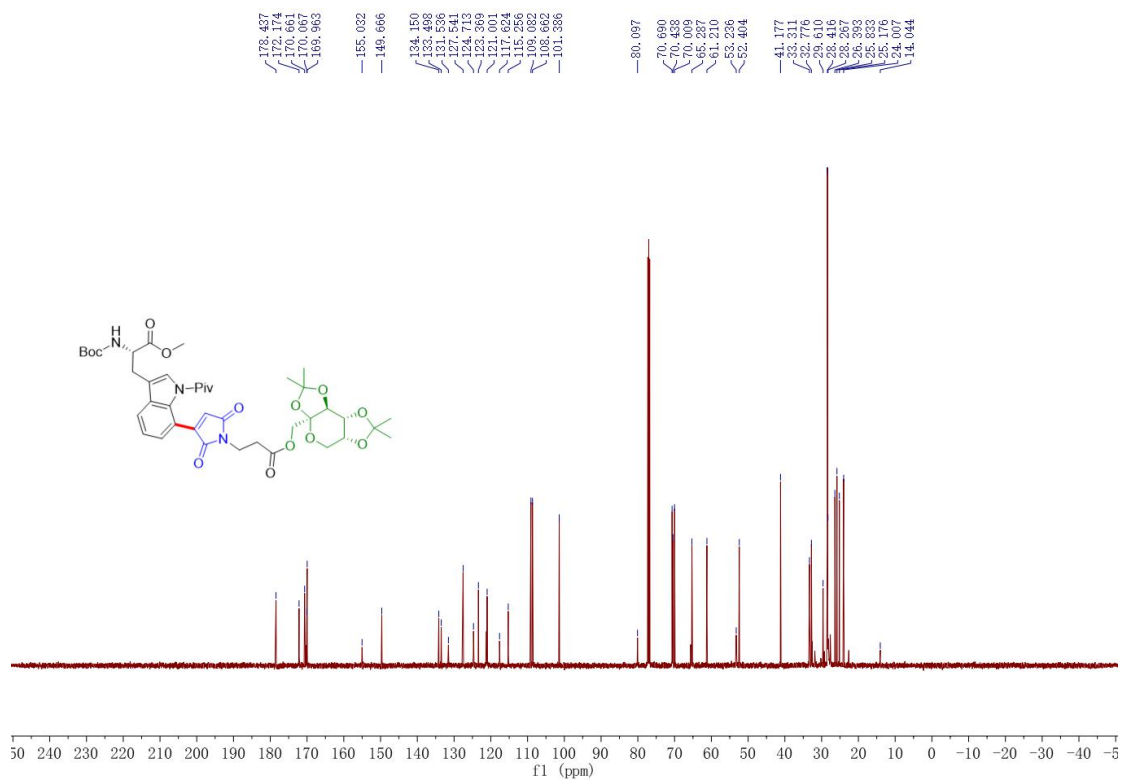
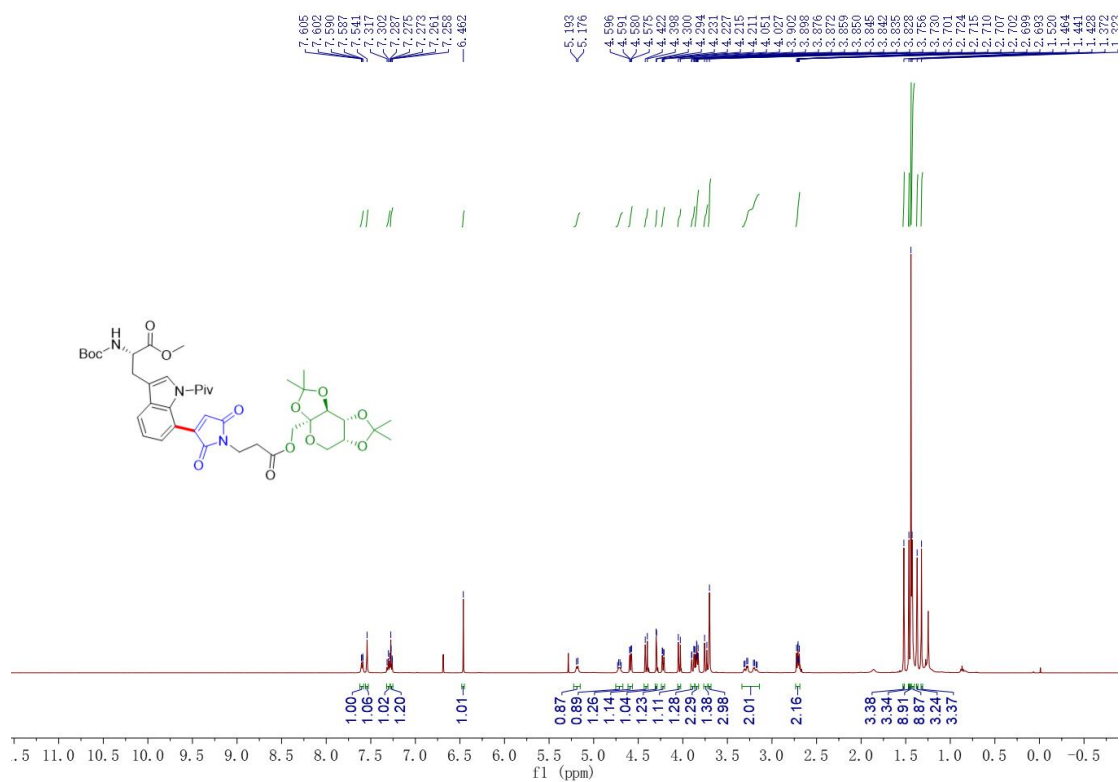


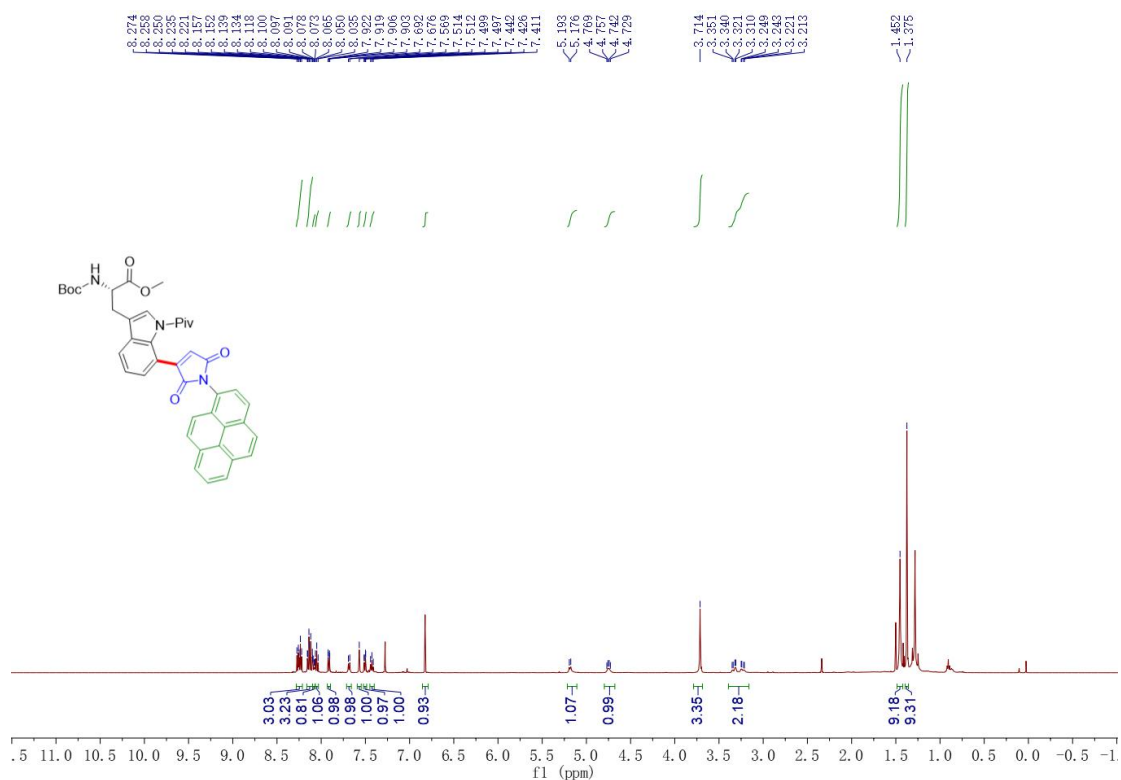


¹H NMR (500 MHz, CDCl₃) spectrum of 7e

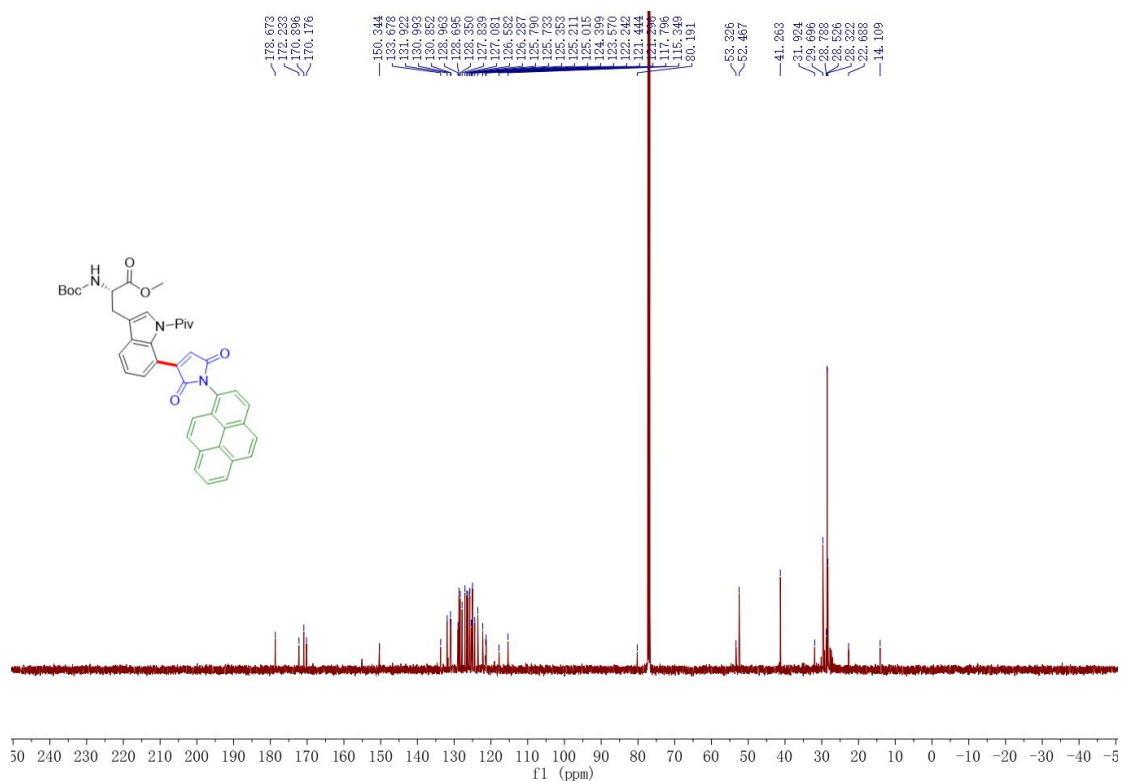


¹³C NMR (126 MHz, CDCl₃) spectrum of 7e

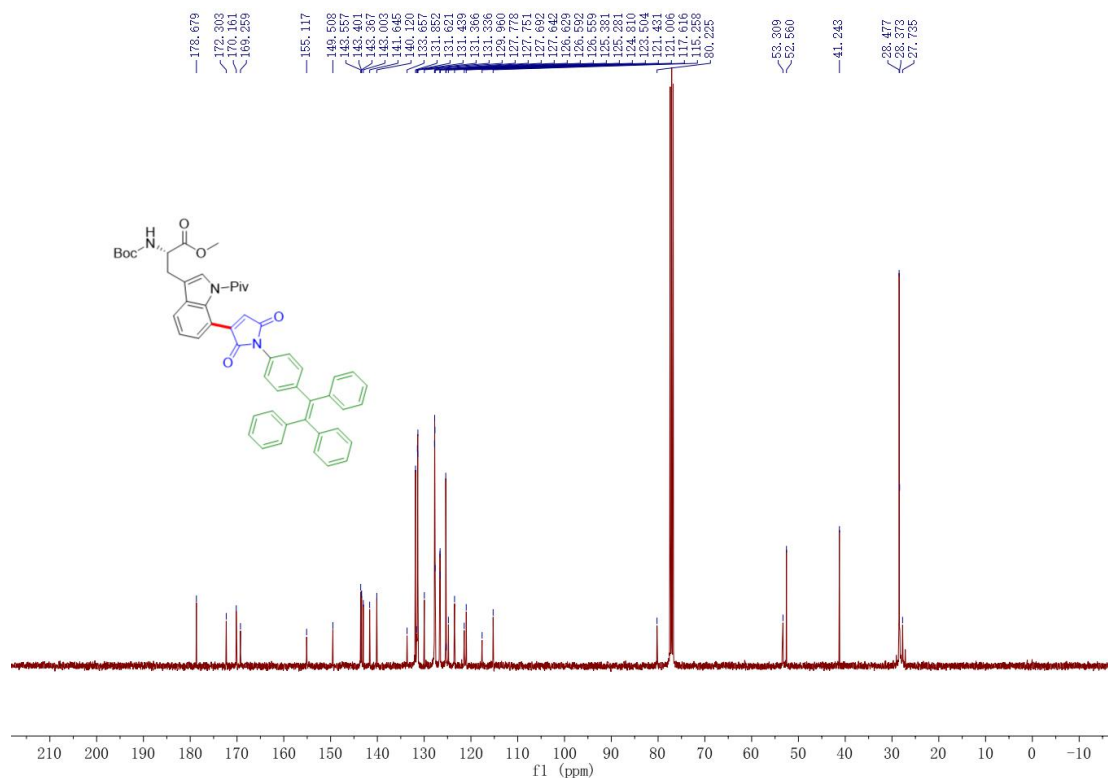
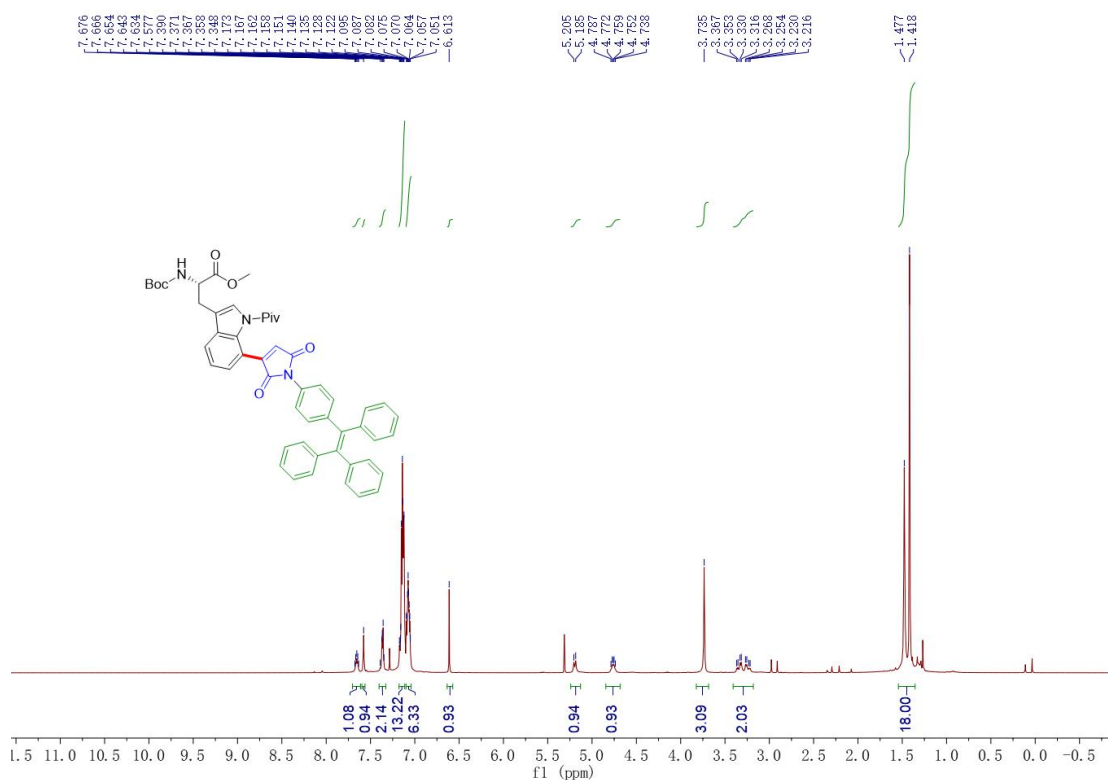


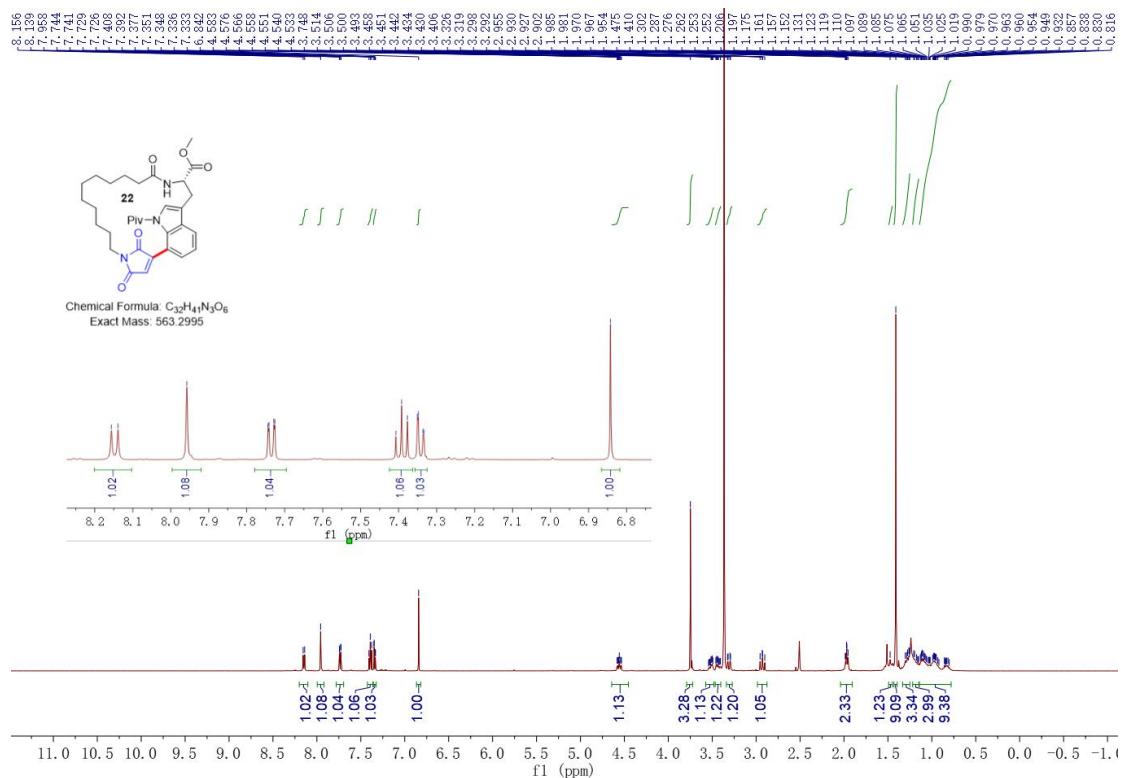


¹H NMR (500 MHz, CDCl₃) spectrum of **7g**

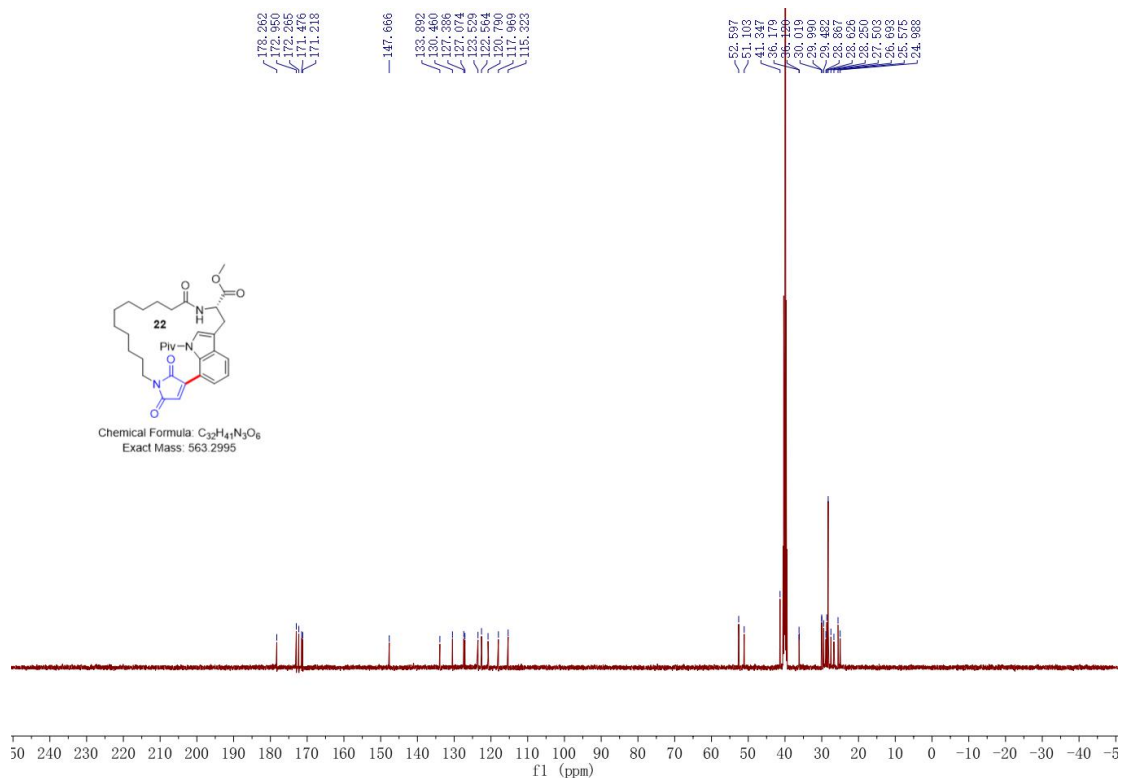


¹³C NMR (126 MHz, CDCl₃) spectrum of **7g**

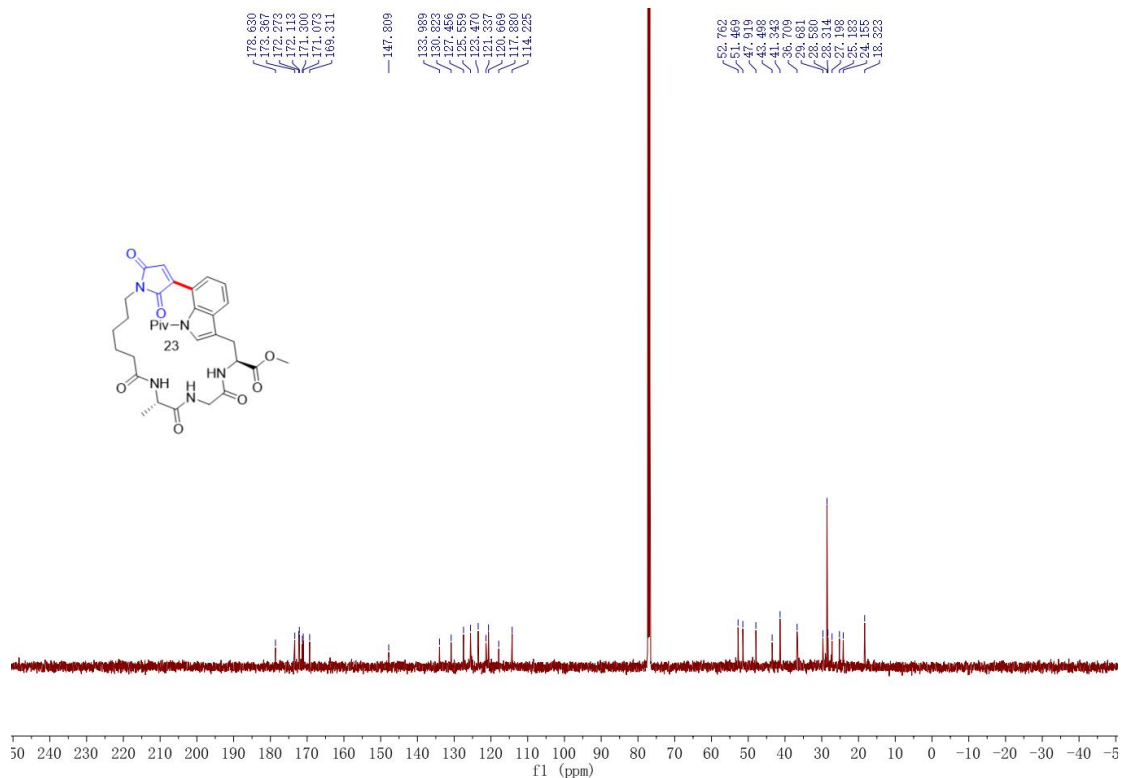
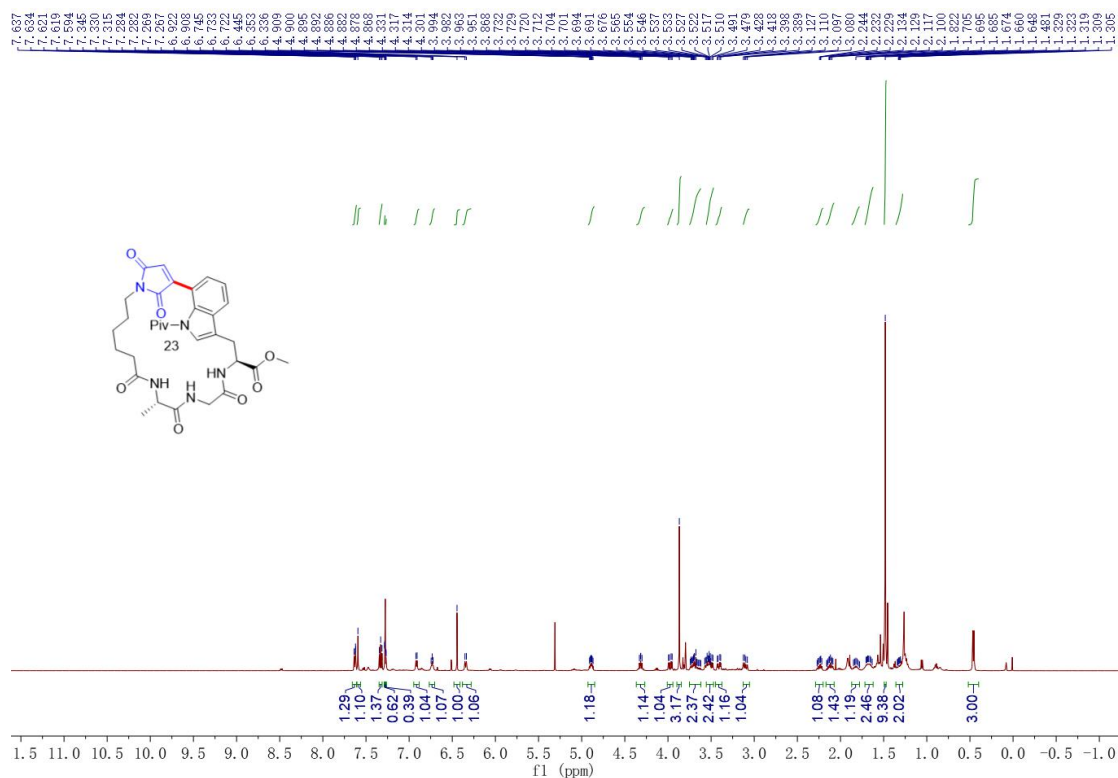


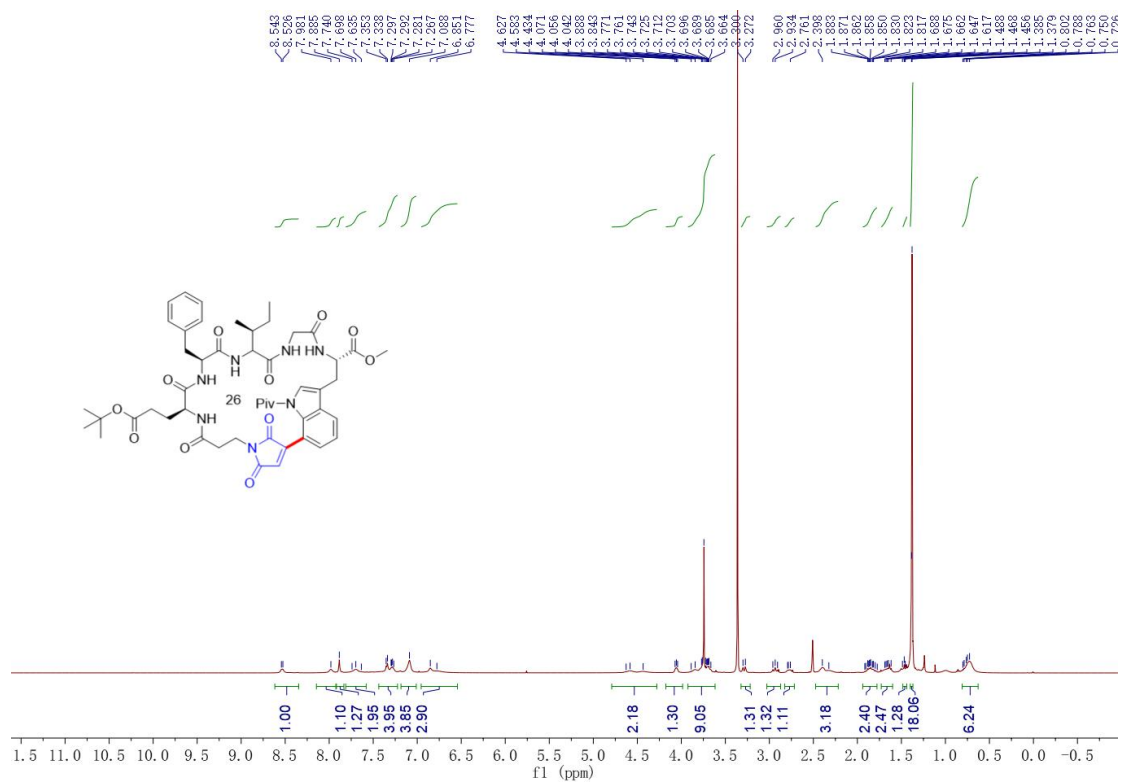


1H NMR (500 MHz, DMSO) spectrum of **9a**

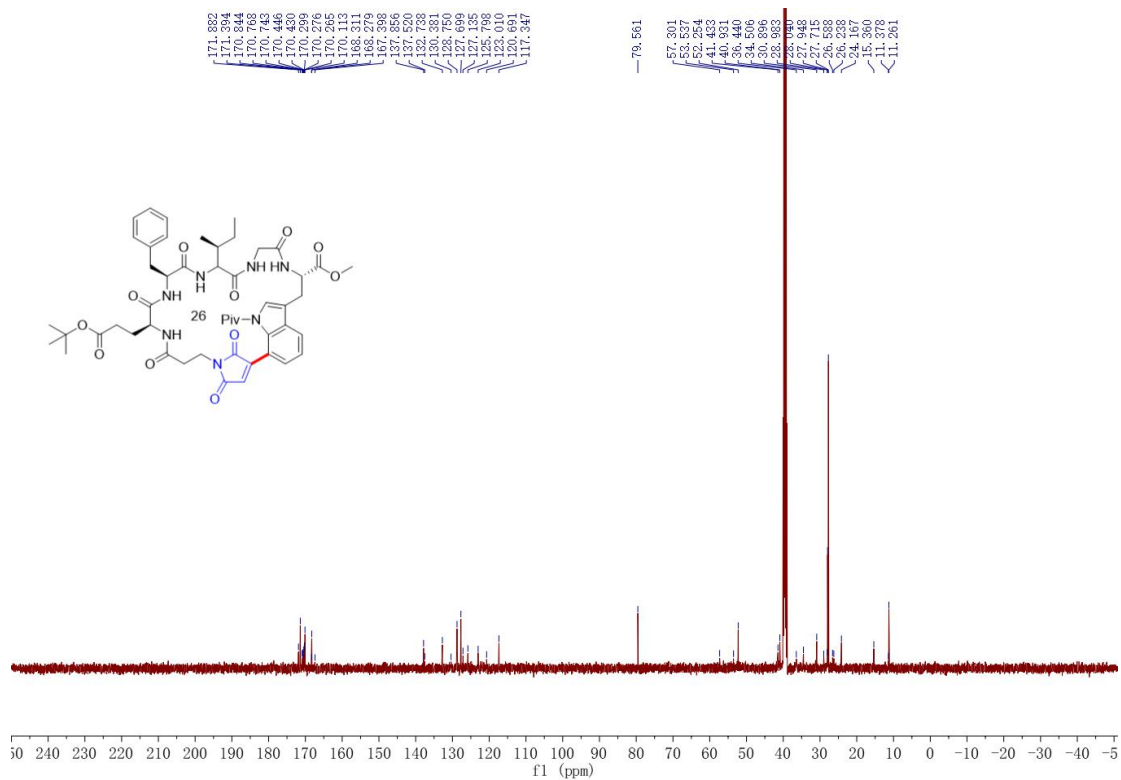


^{13}C NMR (126 MHz, DMSO) spectrum of **9a**

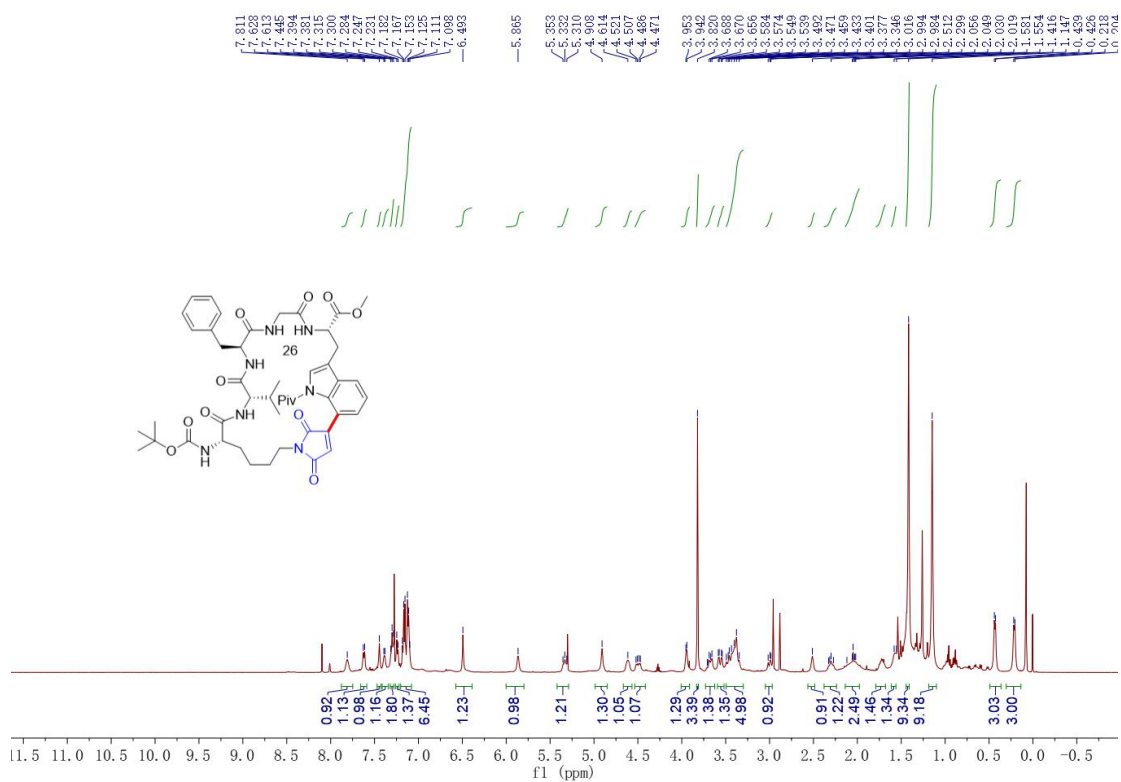




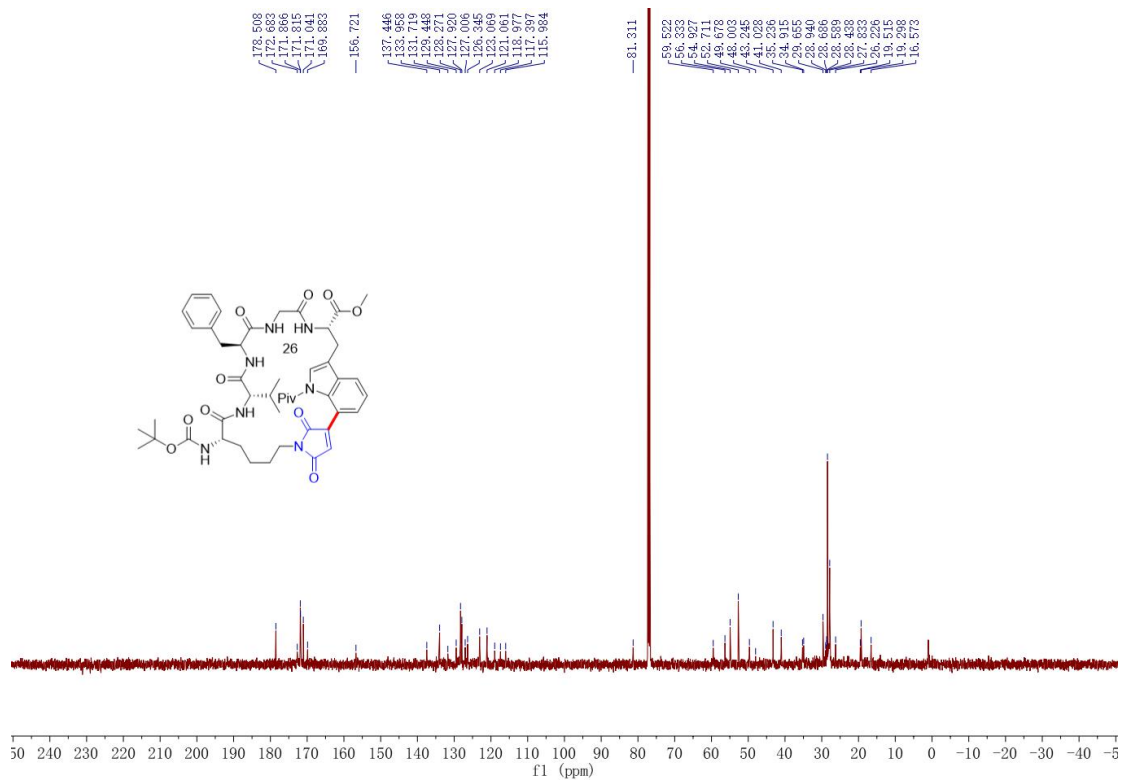
¹H NMR (500 MHz, DMSO) spectrum of 9c



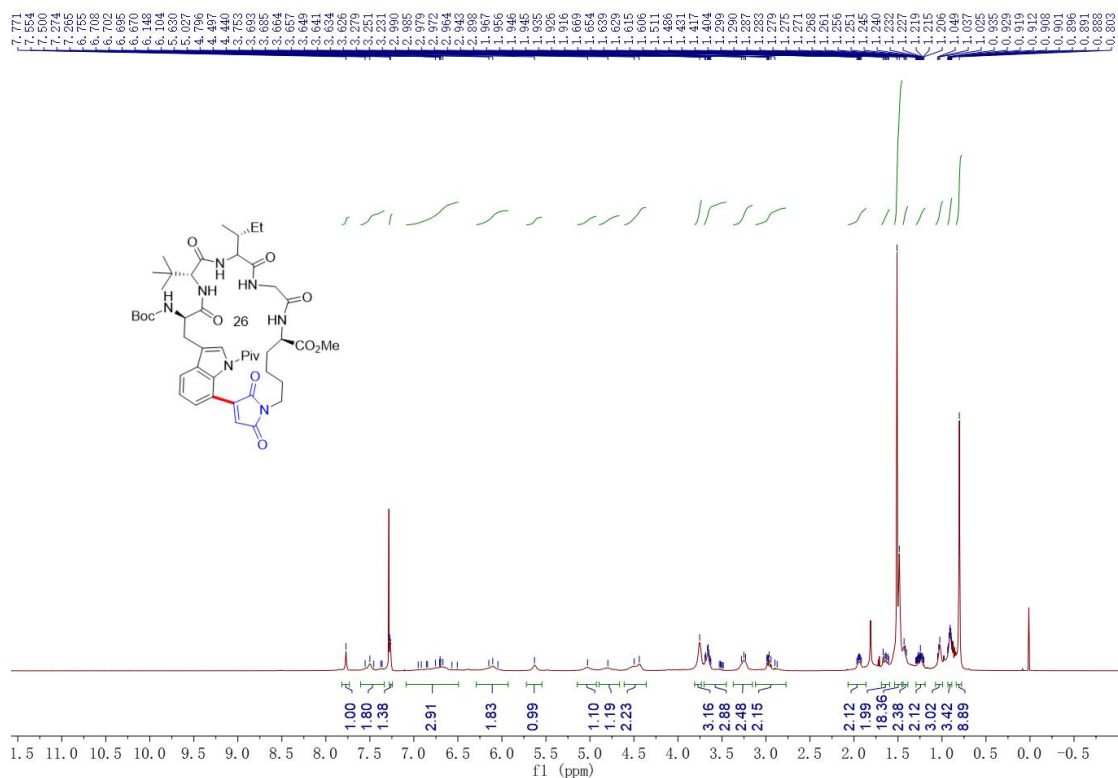
¹³C NMR (126 MHz, DMSO) spectrum of 9c



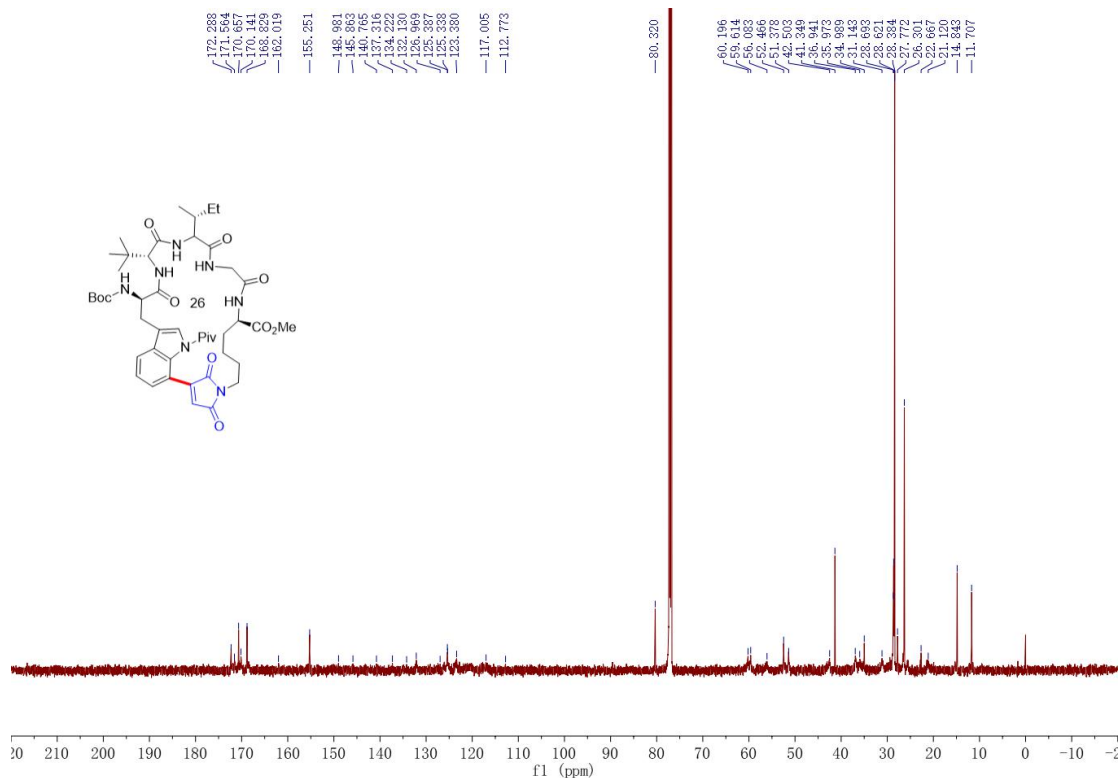
¹H NMR (500 MHz, CDCl₃) spectrum of 9e



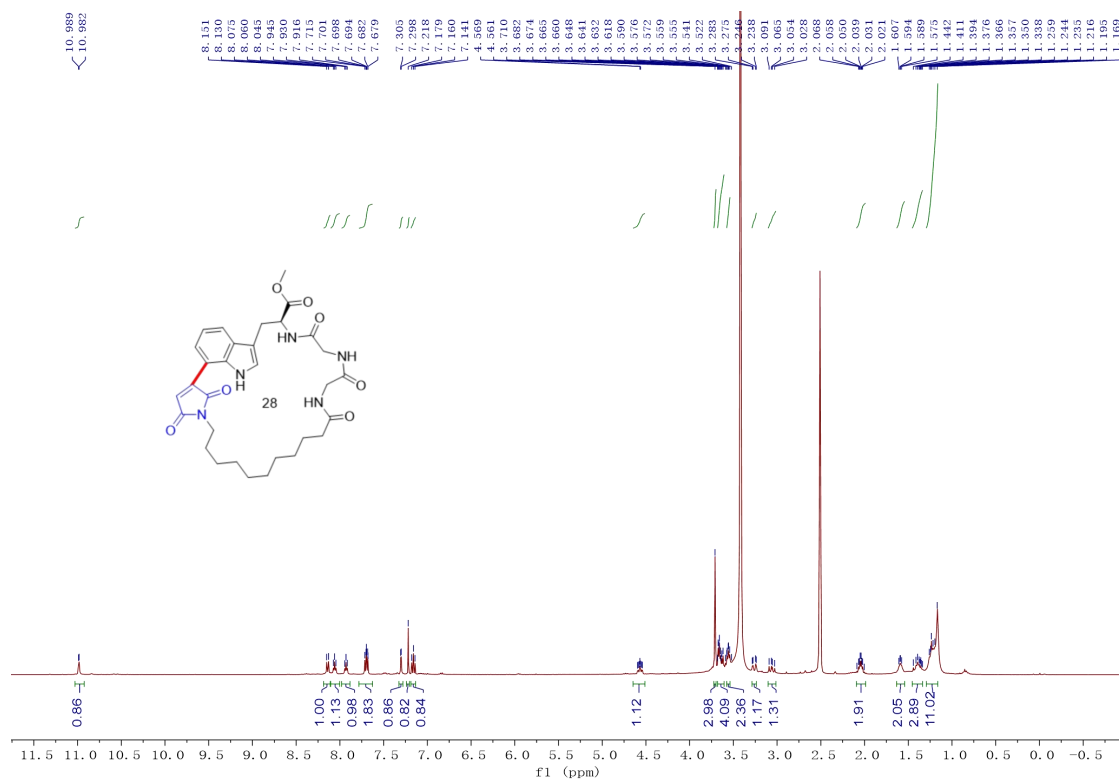
¹³C NMR (126 MHz, CDCl₃) spectrum of 9e



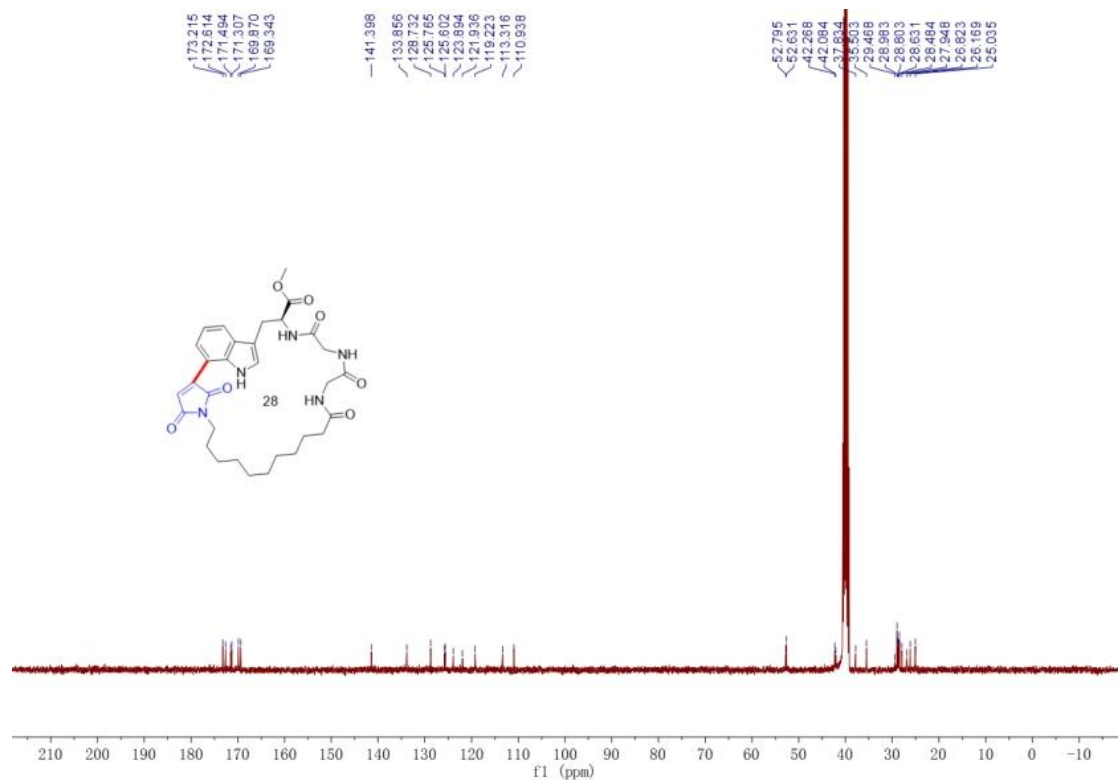
^1H NMR (600 MHz, CDCl_3) spectrum of **9f**



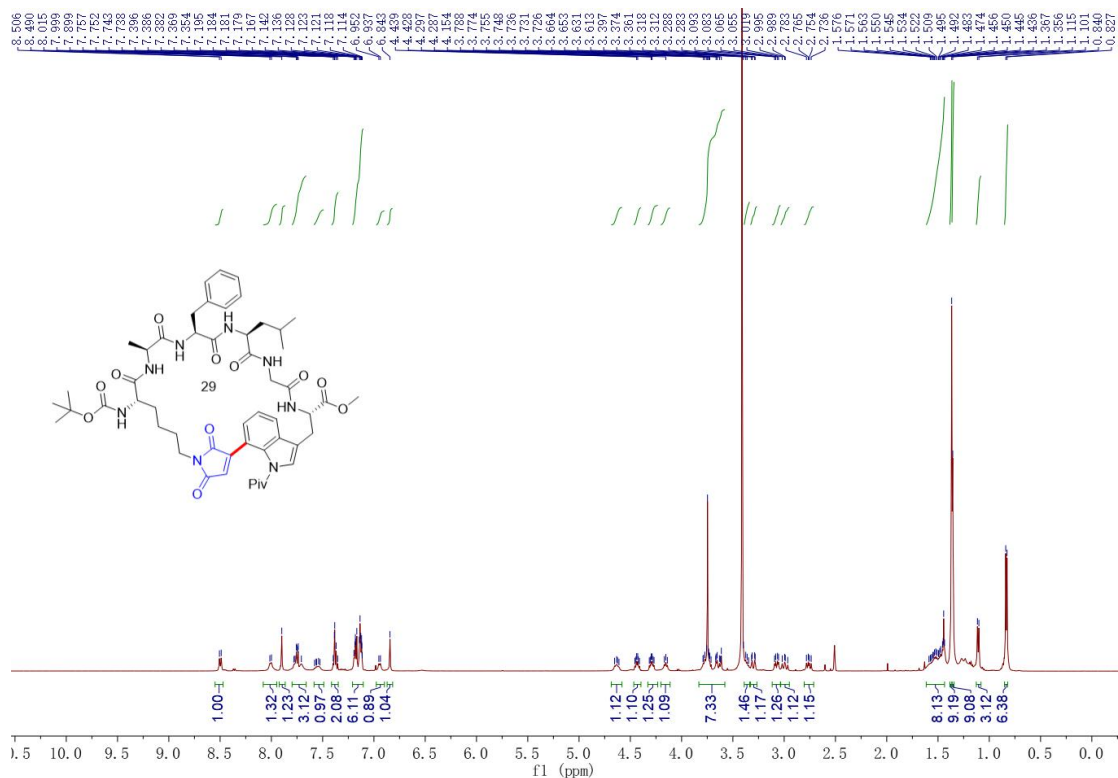
^{13}C NMR (151 MHz, CDCl_3) spectrum of **9f**



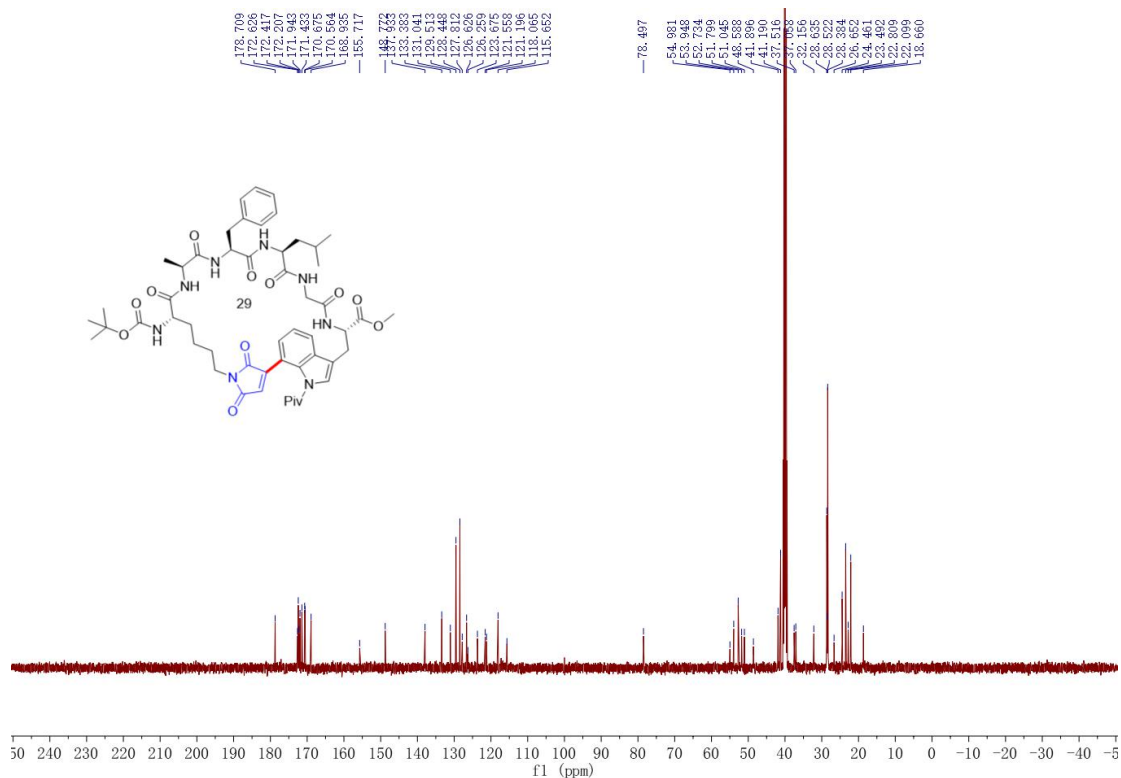
¹H NMR (400 MHz, DMSO) spectrum of **9ha**



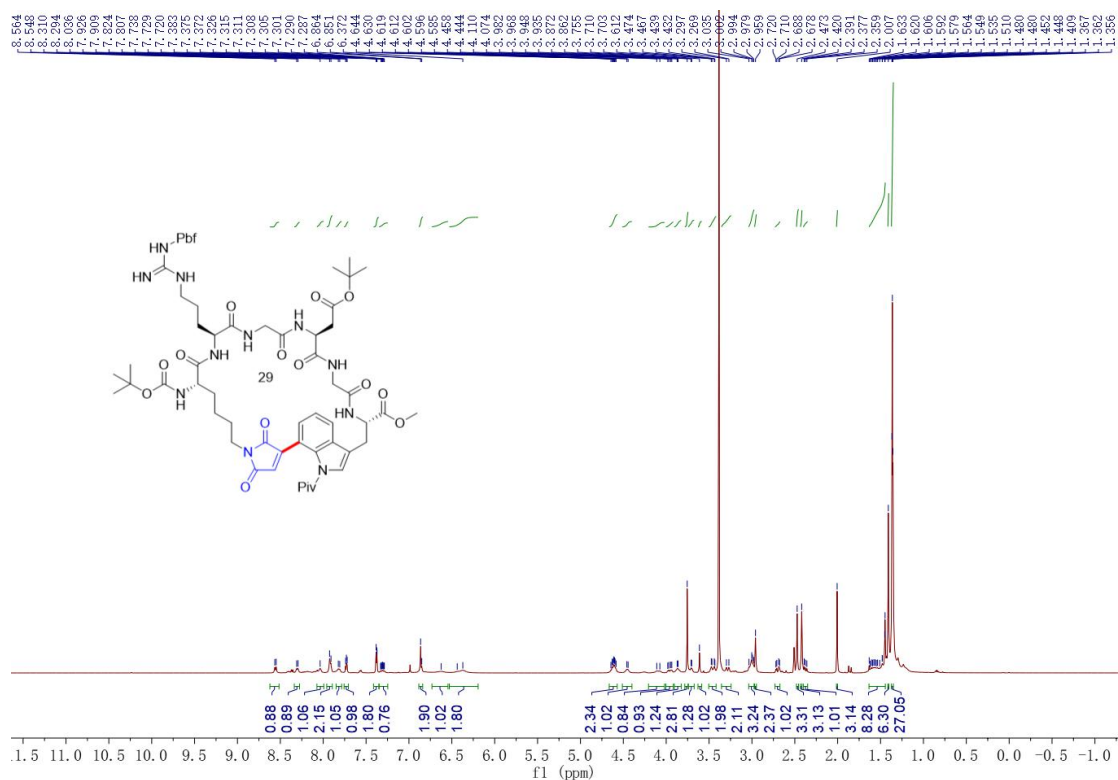
¹³C NMR (101 MHz, DMSO) spectrum of **9ha**



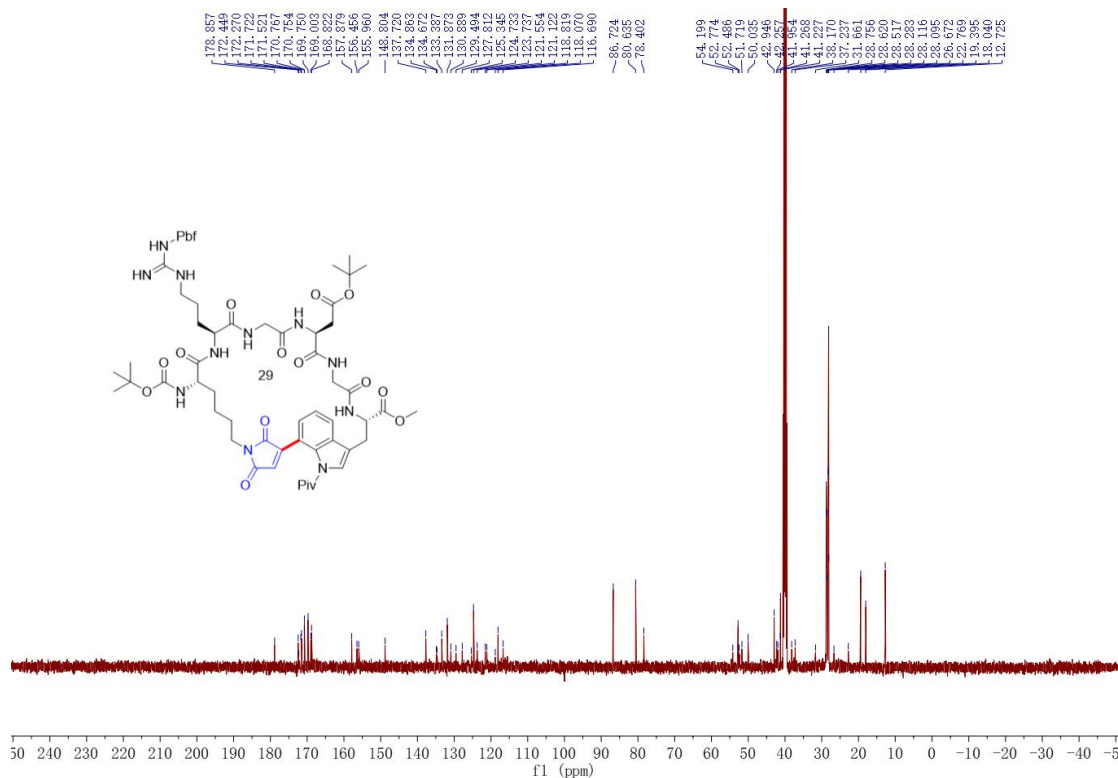
¹H NMR (500 MHz, DMSO) spectrum of **9i**



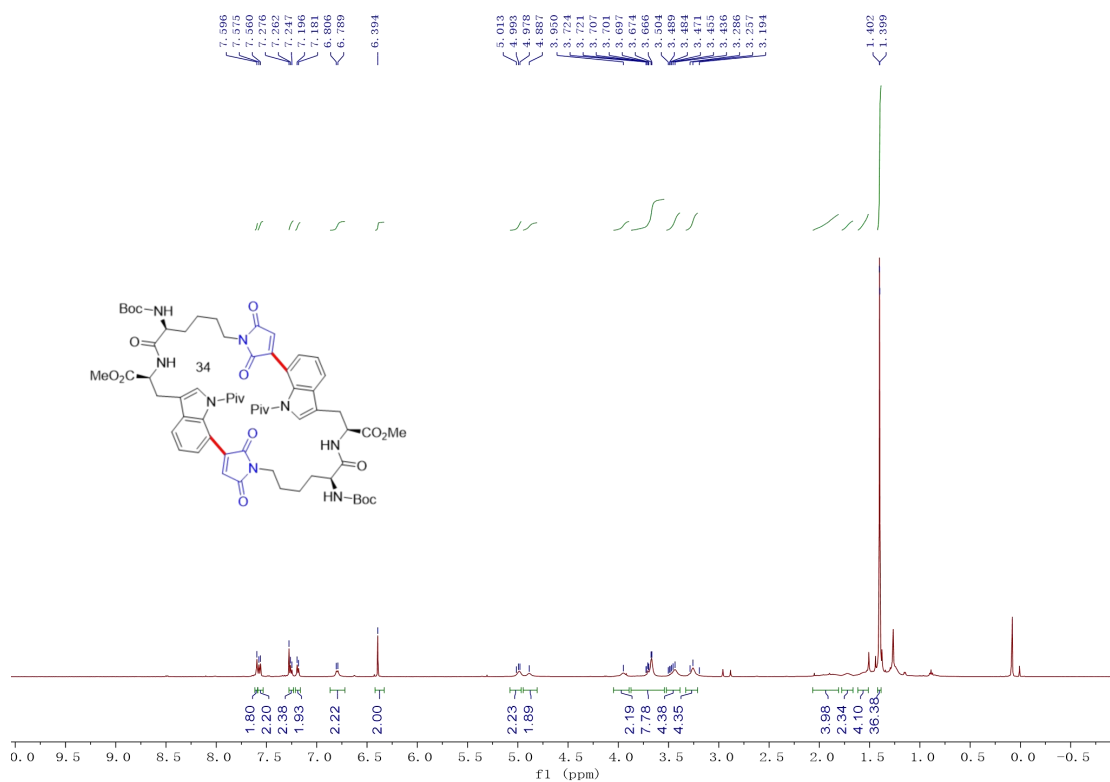
¹³C NMR (126 MHz, DMSO) spectrum of **9i**



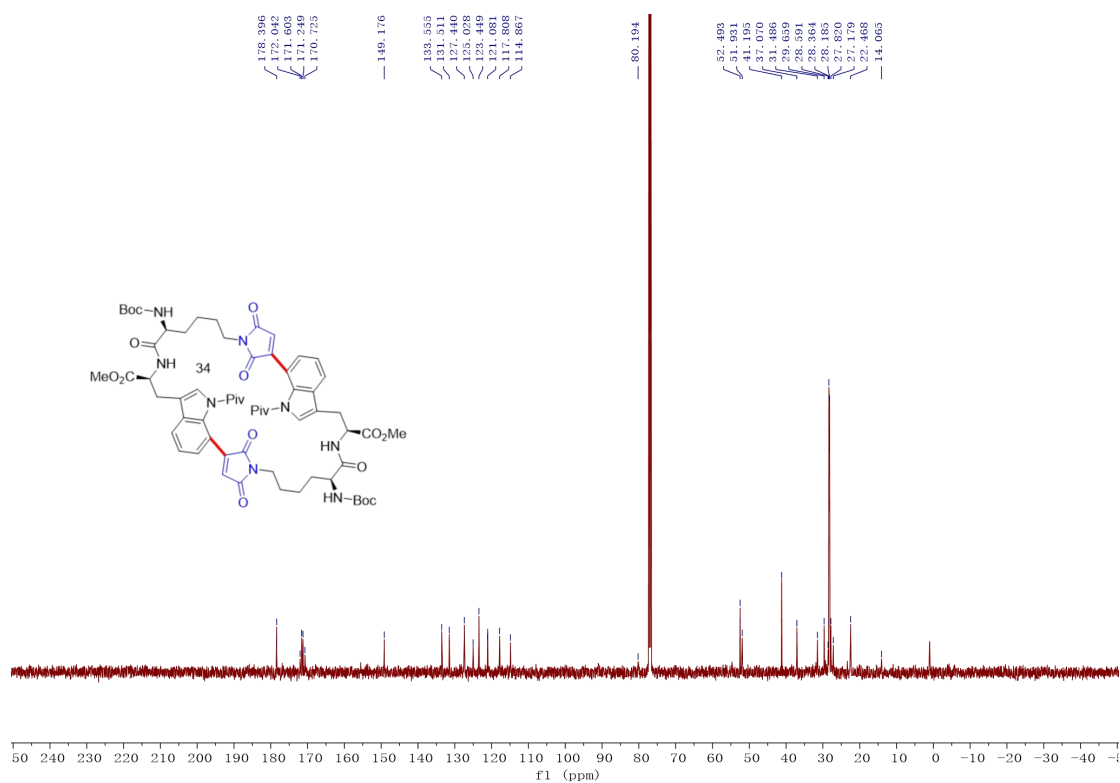
¹H NMR (500 MHz, DMSO) spectrum of **9j**



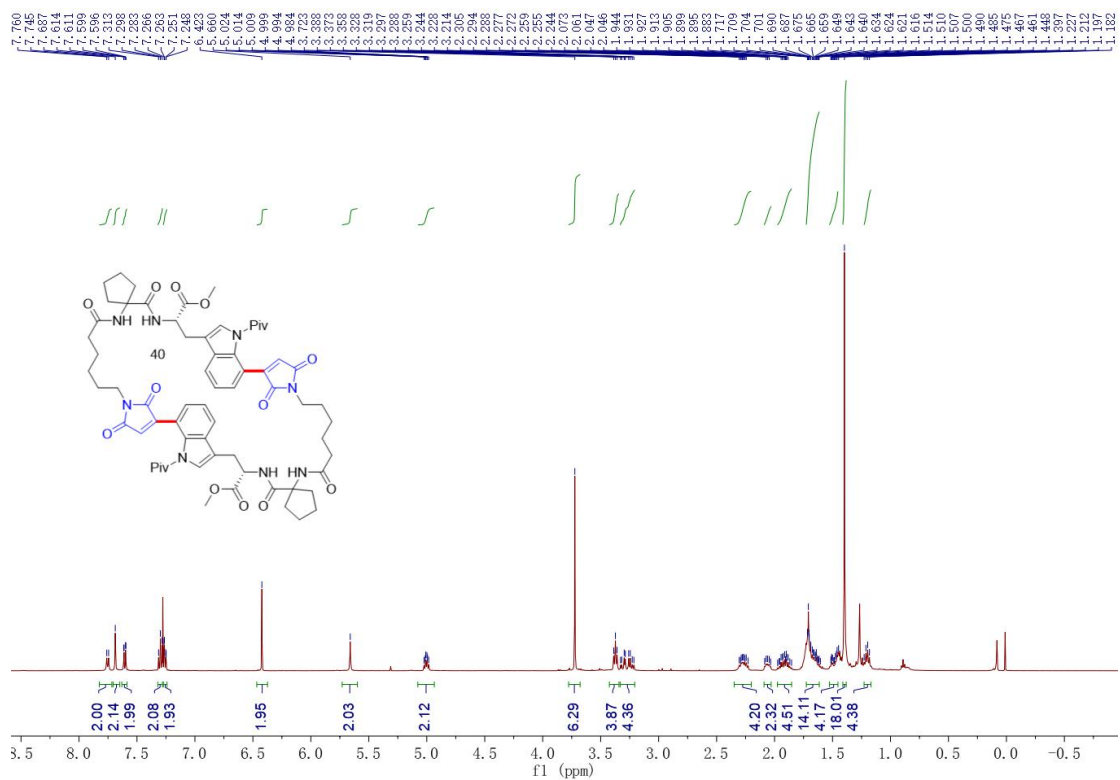
¹³C NMR (126 MHz, DMSO) spectrum of **9j**



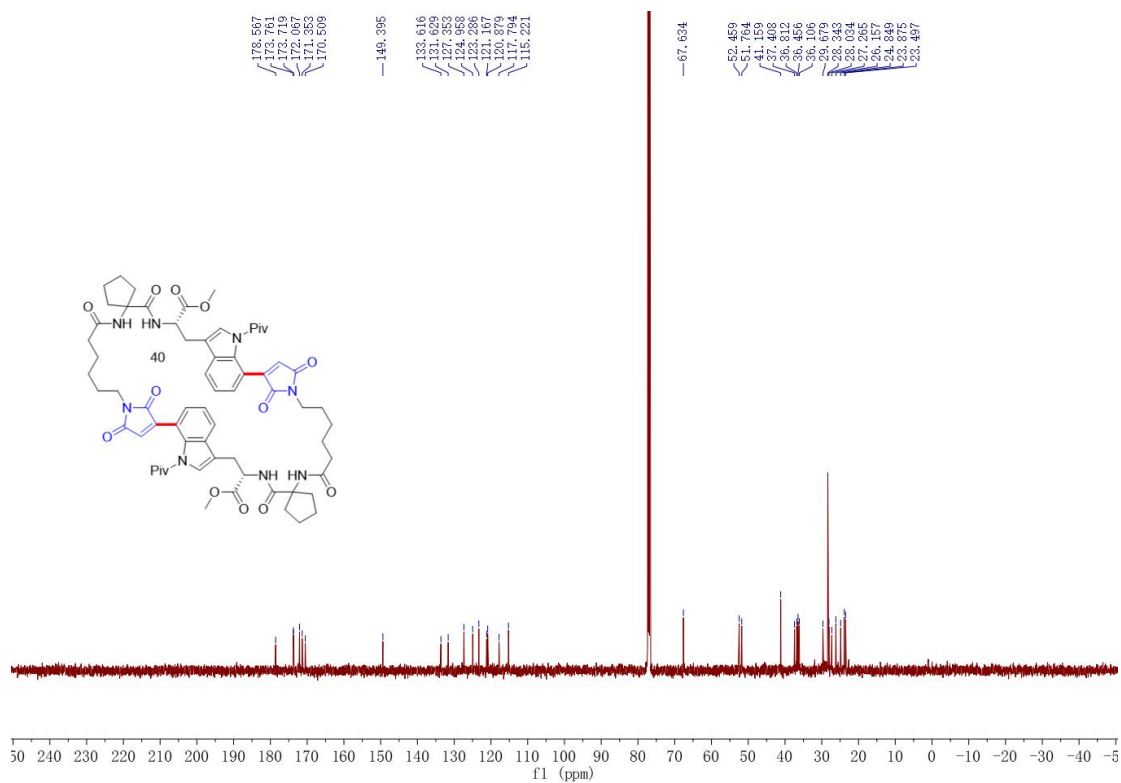
¹H NMR (500 MHz, CDCl₃) spectrum of **9k**



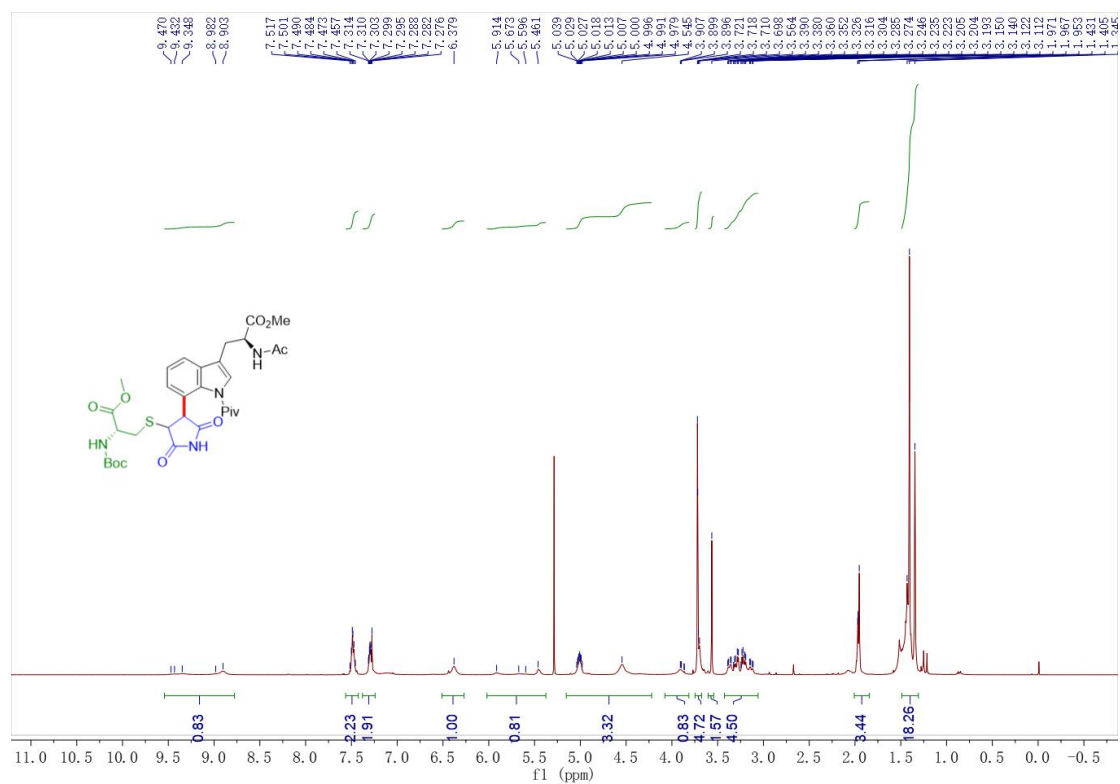
¹³C NMR (126 MHz, CDCl₃) spectrum of **9k**



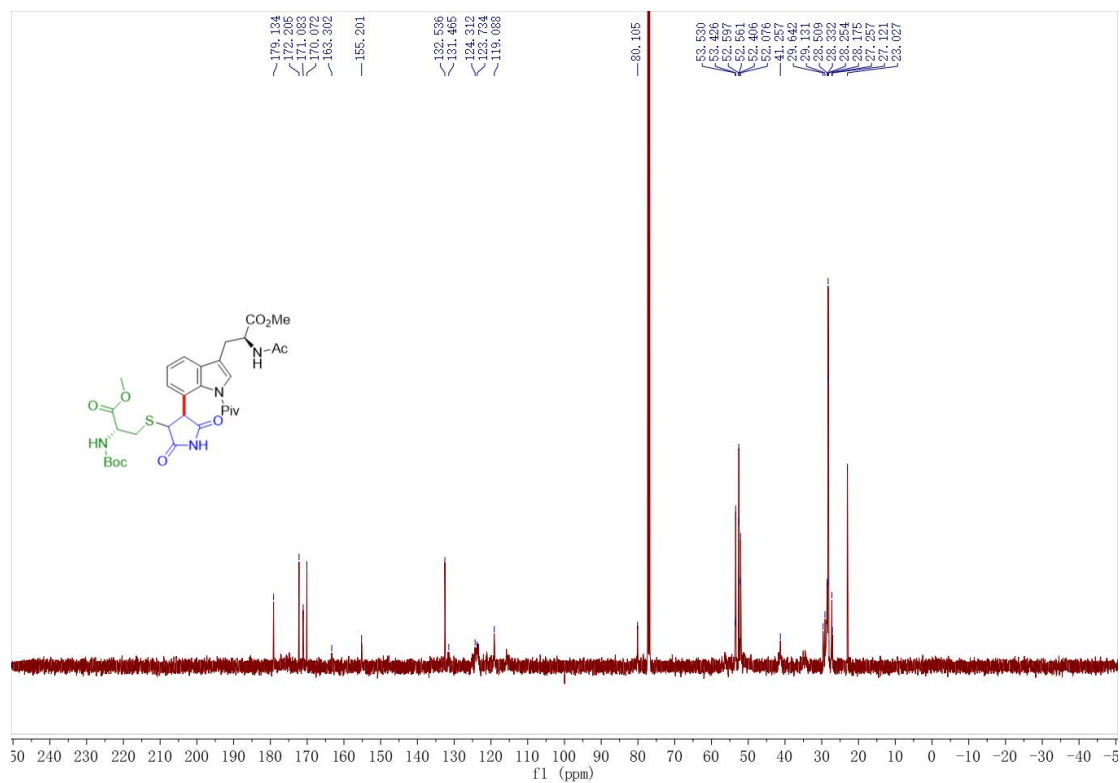
¹H NMR (500 MHz, CDCl₃) spectrum of **9I**



¹³C NMR (126 MHz, CDCl₃) spectrum of **9I**



¹H NMR (500 MHz, CDCl₃) spectrum of **3ba**



¹³C NMR (126 MHz, CDCl₃) spectrum of **3ba**

