

Supplementary Information

Lateral Heterometal Junction Rectifier Fabricated by Sequential Transmetallation of Coordination Nanosheet

Choon Meng Tan¹, Naoya Fukui¹, Kenji Takada¹, Hiroaki Maeda¹, Ekaterina Selezneva^{1,2,3}, Cédric Bourgès⁴, Hiroyasu Masunaga⁵, Sono Sasaki⁶, Kazuhito Tsukagoshi², Takao Mori², Henning Sirringhaus³, Hiroshi Nishihara¹

¹*Research Institute for Science and Technology*

Tokyo University of Science

2641 Yamazaki, Noda, Chiba 278 8510, Japan

Email: nishihara@rs.tus.ac.jp

²*WPI International Center for Materials Nanoarchitectonics (WPI-MANA)*

National Institute for Materials Science (NIMS)

Namiki 1-1, Tsukuba 305-0044, Japan

³*Cavendish Laboratory*

University of Cambridge

JJ Thomson Avenue, Cambridge CB3 0HE, UK

⁴*International Center for Young Scientists (ICYS)*

National Institute for Materials Science

1-1 Namiki, Tsukuba, 305-0044, Japan

⁵*Japan Synchrotron Radiation Research Institute (JASRI)*

1-1-1 Kouto, Sayo-cho, Sayo-gun, Hyogo 679-5198, Japan

⁶*Faculty of Fiber Science and Engineering*

Kyoto Institute of Technology

1 Matsugasaki Hashikami-cho, Sakyo-ku, Kyoto 606-8585, Japan

RIKEN SPring-8 Centre

1-1-1 Kouto, Sayo-cho, Sayo-gun, Hyogo 679-5148, Japan

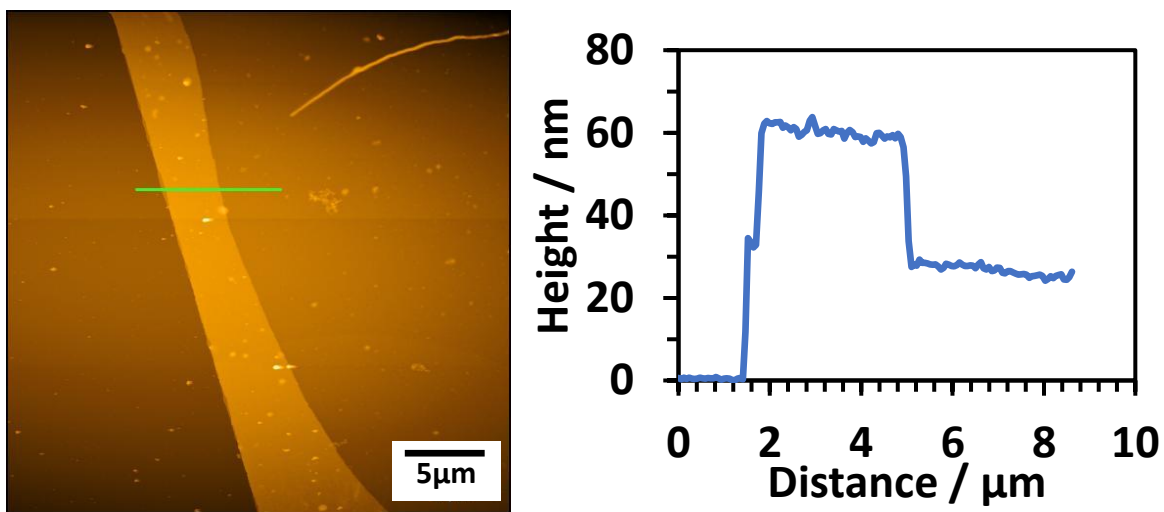


Figure S1. AFM topography image of Zn_3BHT and the height analysis at the green line.

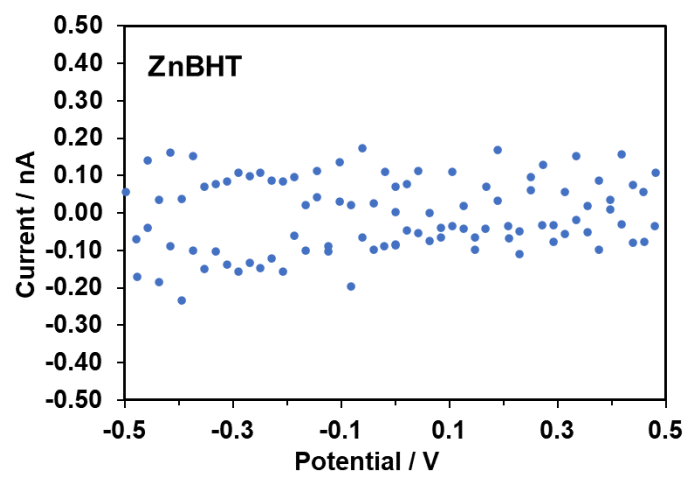
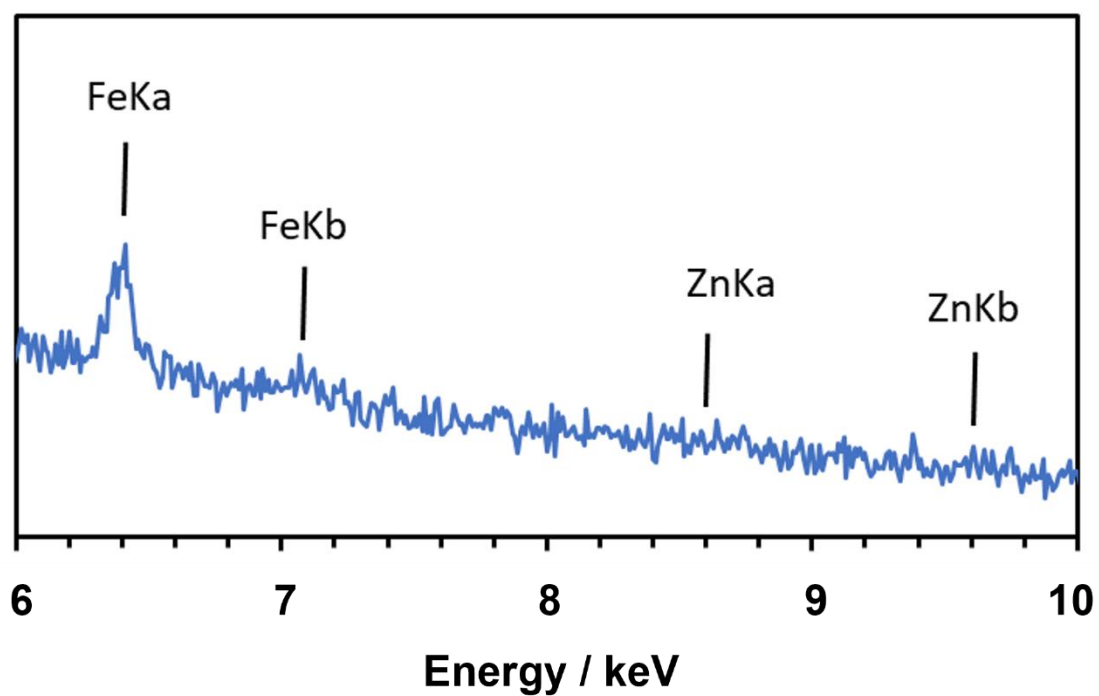
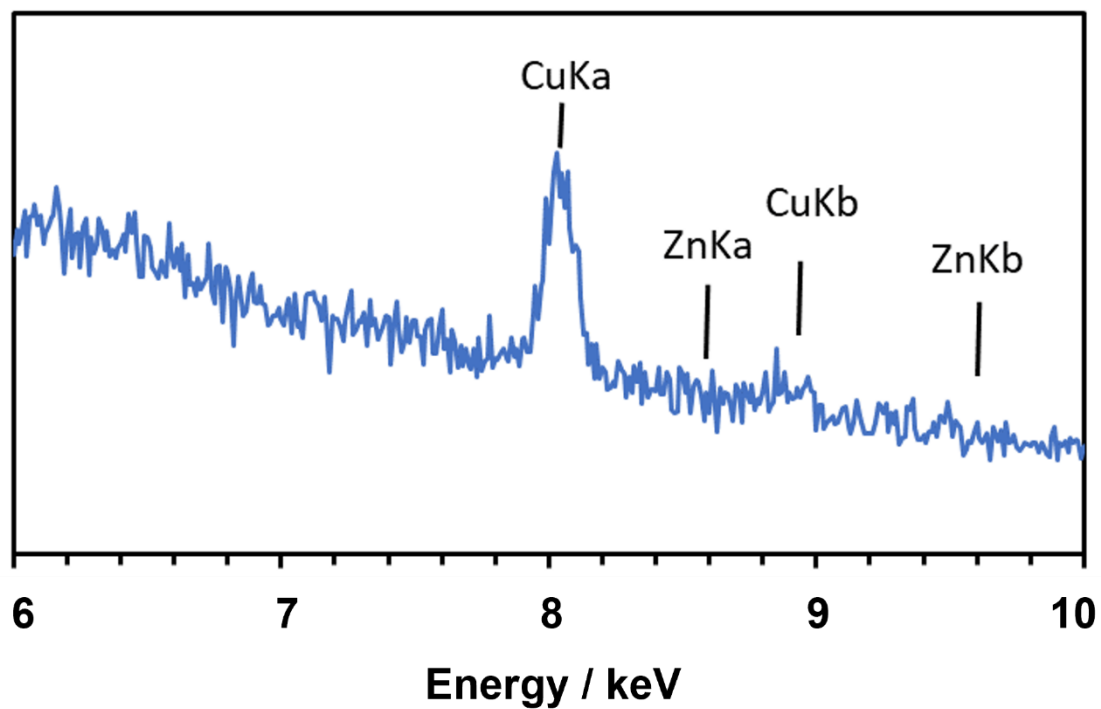


Figure S2. *I*-*V* curve of Zn₃BHT.



Element	Line	Mass%	Atom%
C	K	10.75±0.21	19.13±0.38
O	K	22.94±0.23	30.65±0.31
Si	K	65.22±0.21	49.63±0.16
S	K	0.64±0.03	0.43±0.02
Fe	K	0.42±0.04	0.16±0.02
Cu	K	0.02±0.03	0.01±0.01
Zn	K	Not detected	Not detected
Total		100.00	100.00

Figure S3. EDS energy spectrum (top) and atomic ratio (bottom) of tmFe



Element	Line	Mass%	Atom%
C	K	12.28±0.17	21.78±0.31
O	K	21.45±0.18	28.56±0.23
Si	K	64.14±0.16	48.64±0.12
S	K	0.93±0.03	0.62±0.02
Fe	K	0.03±0.01	0.01±0.01
Cu	K	1.16±0.08	0.39±0.03
Zn	K	Not detected	Not detected
Total		100.00	100.00

Figure S4. EDS energy spectrum (top) and atomic ratio (bottom) of tmCu

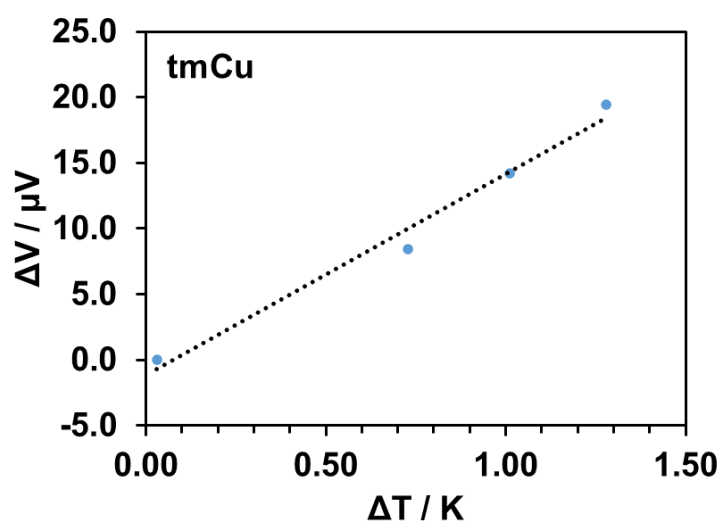
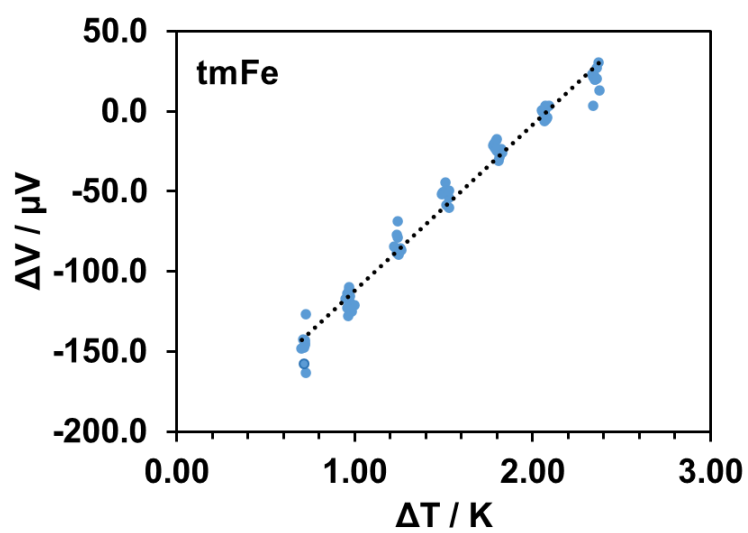


Figure S5. ΔV - ΔT plots of tmFe and tmCu.

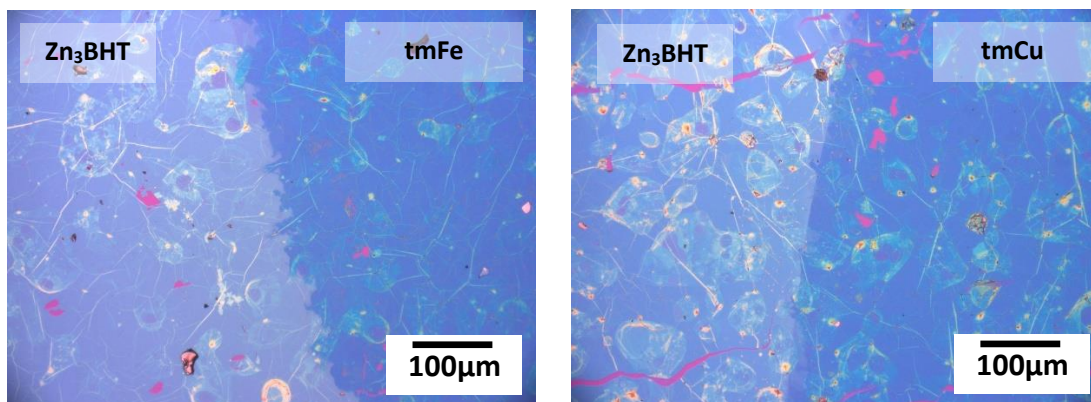


Figure S6. Optical images of Zn₃BHT/tmFe and Zn₃BHT/tmCu on silicon substrates.

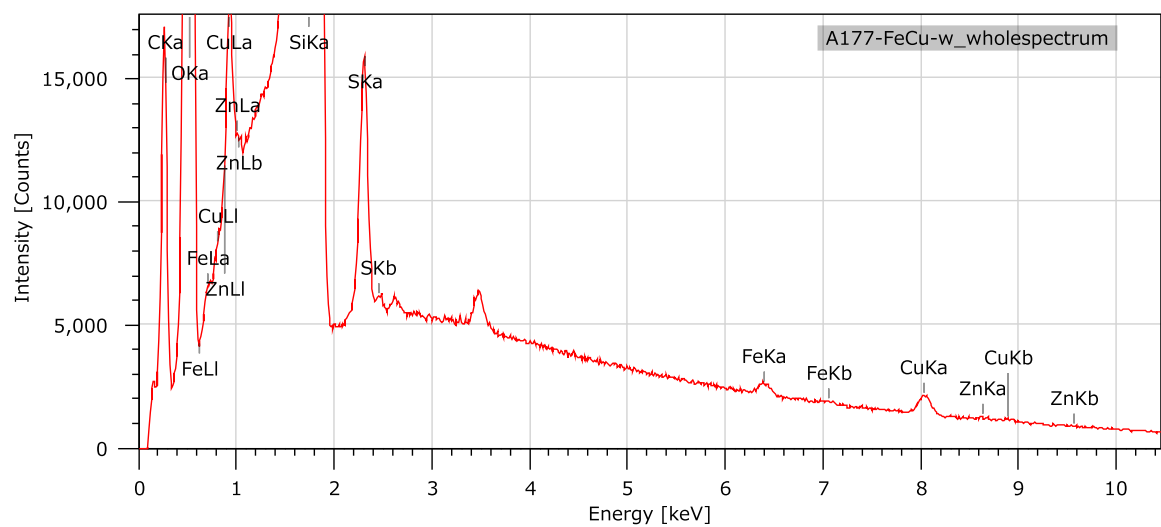


Figure S7. SEM-EDS mapping energy spectrum for tmFe/tmCu.

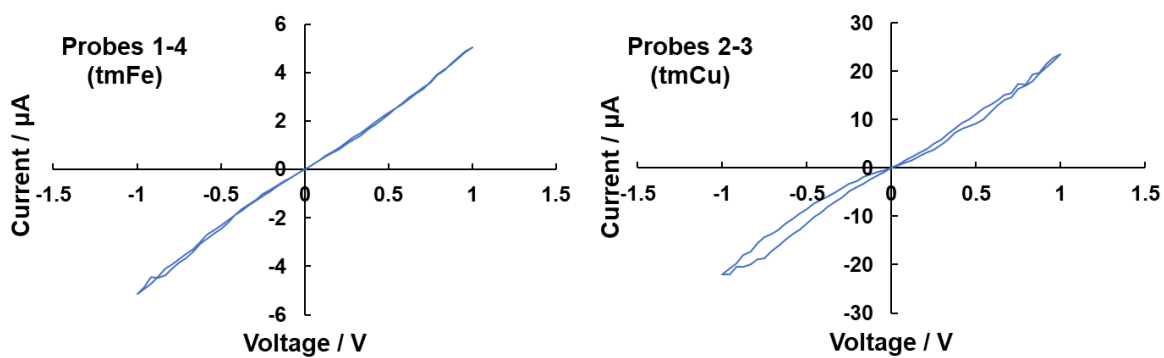


Figure S8. *I*-*V* curves measured between the 2 probes within each respective tmFe or tmCu region indicating ohmic behaviour.

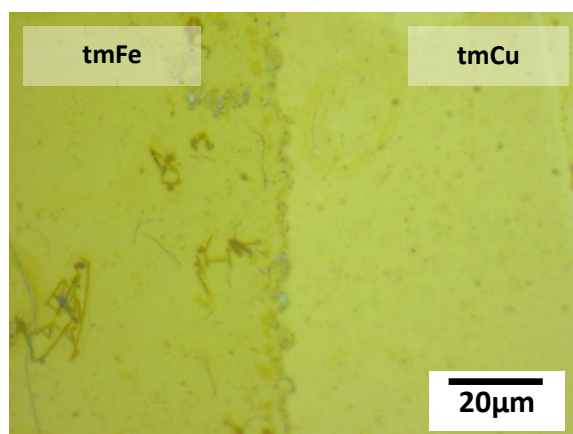


Figure S9. Optical image of tmFe/tmCu heterojunction on an Au/mica for KFM studies.