

Supplementary information

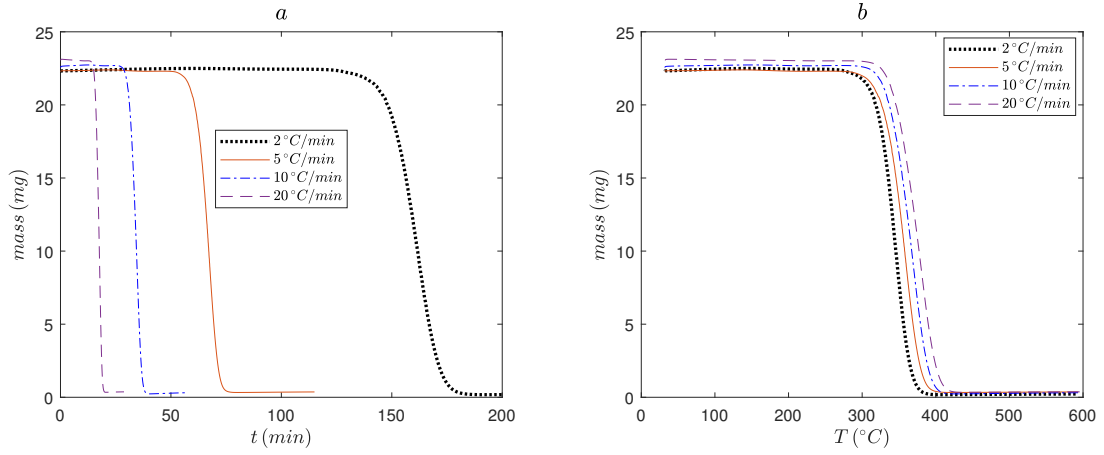


Fig. S1 TG curves of PMMA degradation against a) reaction time and b) reaction temperature.

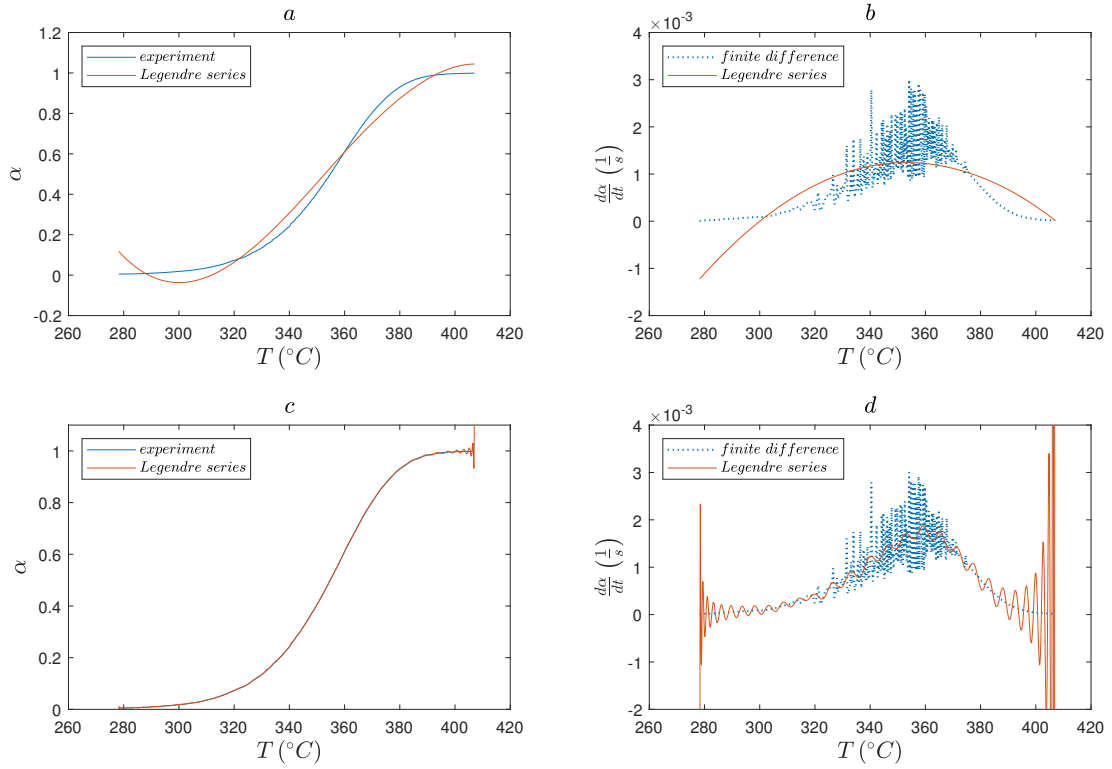


Fig. S2 Influence of N on the results of Legendre series expansion of $\alpha - t$ curve of PMMA degradation with heating rate of 5 °C/min, a,b) $N = 3$, and c,d) $N = 60$ using trapezoidal rule of integration.

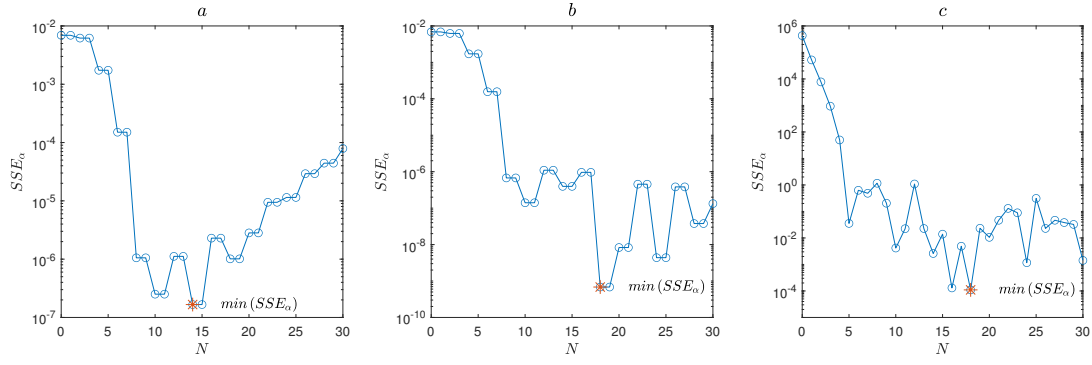


Fig. S3 Influence of N on the SSE_α of Legendre series expansion of $\alpha - t$ curve of PMMA degradation with heating rate of $5^\circ\text{C}/\text{min}$ using a) trapezoidal rule of integration, b) Simpson's rule of integration, c) Gauss-Legendre quadrature.

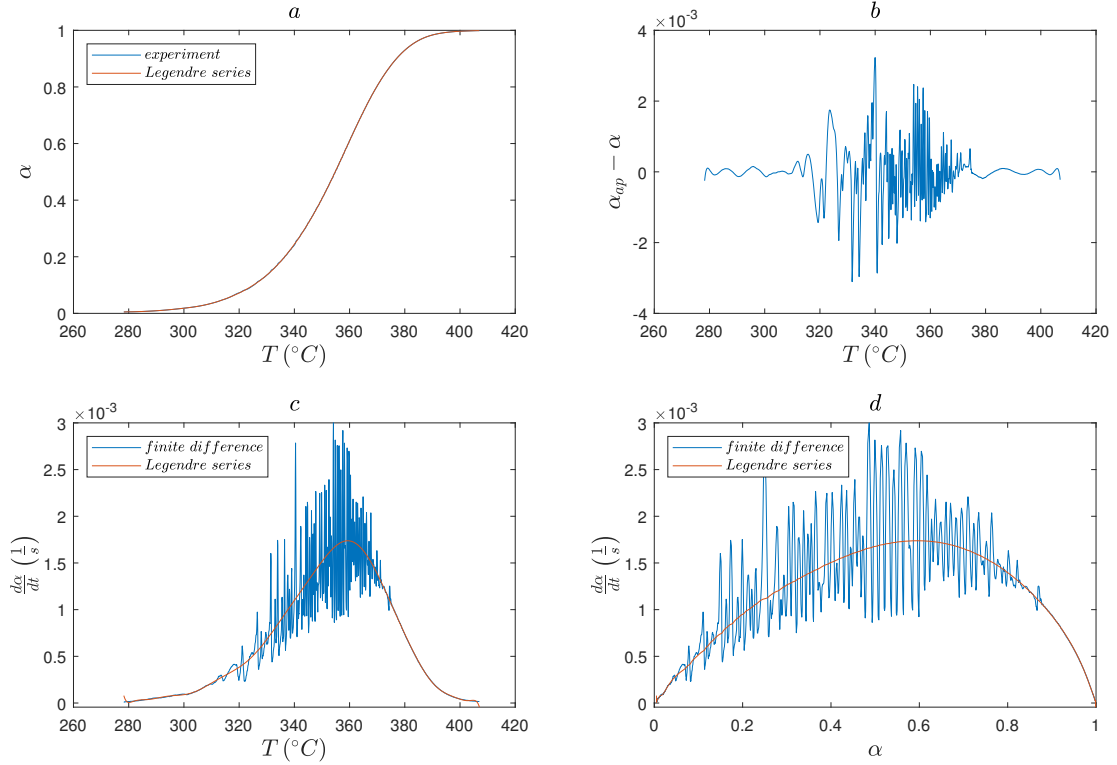


Fig. S4 a) Comparison of Legendre series expansion using Simpson's rule of integration ($N = 18$) with experimental values of conversion, b) deviation in conversion, c,d) comparison of Legendre series expansion and finite difference methods for evaluation of $(d\alpha/dt)$ of PMMA degradation with heating rate of $5^\circ\text{C}/\text{min}$.

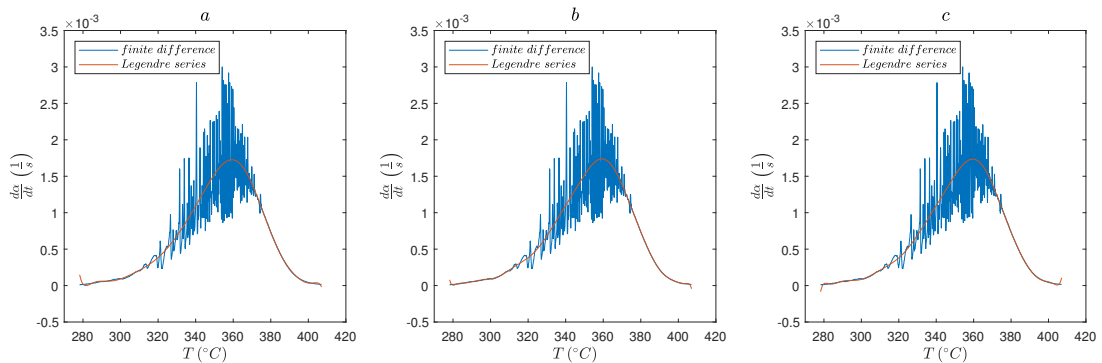


Fig. S5 The $(d\alpha/dt)$ curves of PMMA degradation with heating rate of $5^\circ\text{C}/\text{min}$ evaluated by application of Legendre series expansion with optimal values of N a) trapezoidal rule of integration ($N = 14$), b) Simpson's rule of integration ($N = 18$), c) Gauss-Legendre quadrature ($N = 18$).

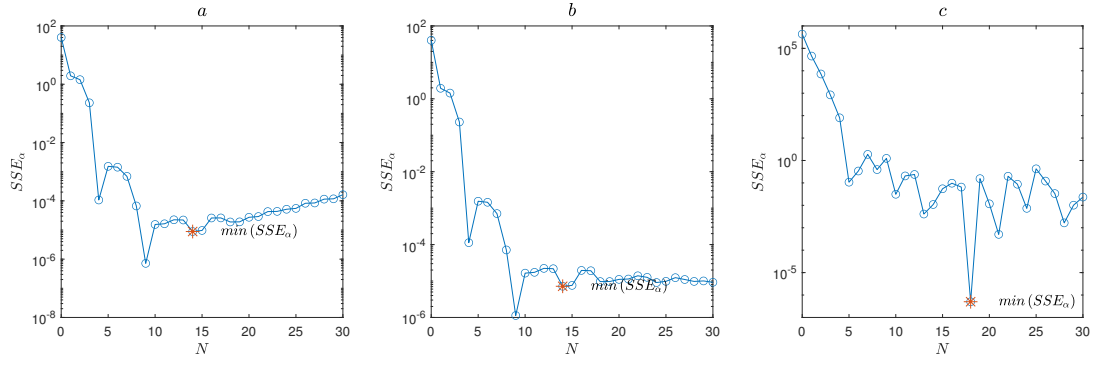


Fig. S6 Influence of N on the SSE_α of Legendre series expansion of $\alpha - T$ curve of PMMA degradation with heating rate of $5^\circ\text{C}/\text{min}$ using a) trapezoidal rule of integration, b) Simpson's rule of integration, c) Gauss-Legendre quadrature.

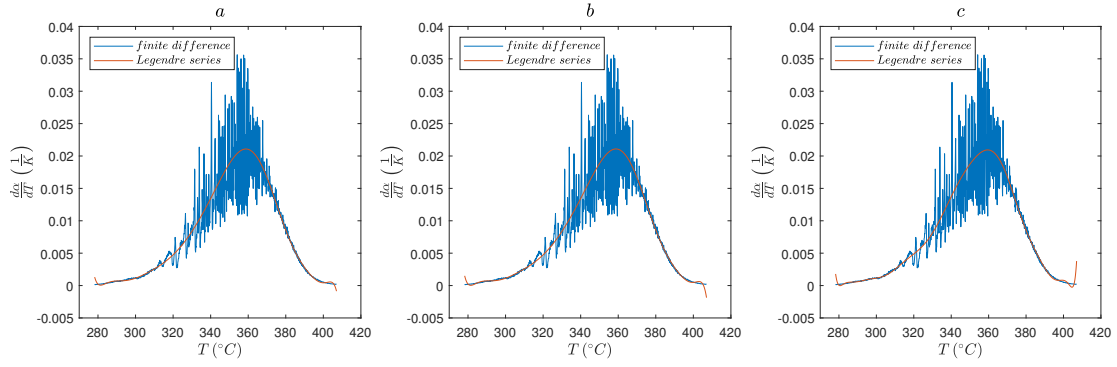


Fig. S7 The $(d\alpha/dT)$ curves of PMMA degradation with heating rate of $5^\circ\text{C}/\text{min}$ evaluated by application of Legendre series expansion with optimal values of N a) trapezoidal rule of integration ($N = 14$), b) Simpson's rule of integration ($N = 14$), c) Gauss-Legendre quadrature ($N = 18$).

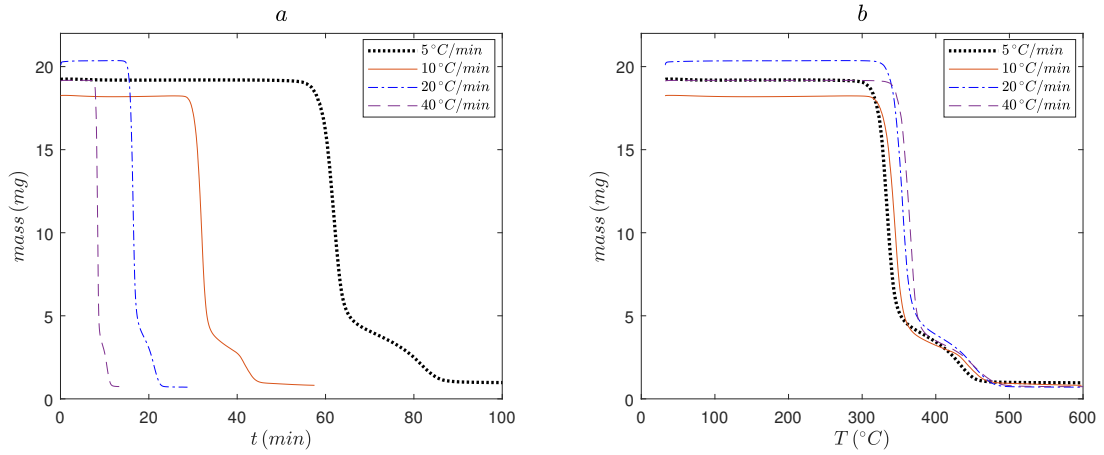


Fig. S8 TG curves of PLA/PA degradation against a) reaction time and b) reaction temperature.

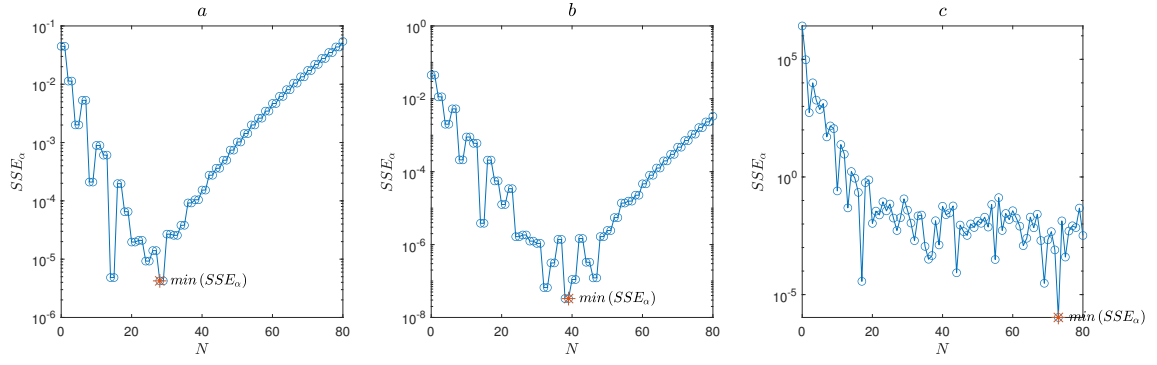


Fig. S9 Influence of N on the SSE_α of Legendre series expansion of $\alpha - t$ curve of PLA/PA degradation with heating rate of $5^\circ\text{C}/\text{min}$ using a) trapezoidal rule of integration, b) Simpson's rule of integration, c) Gauss-Legendre quadrature.

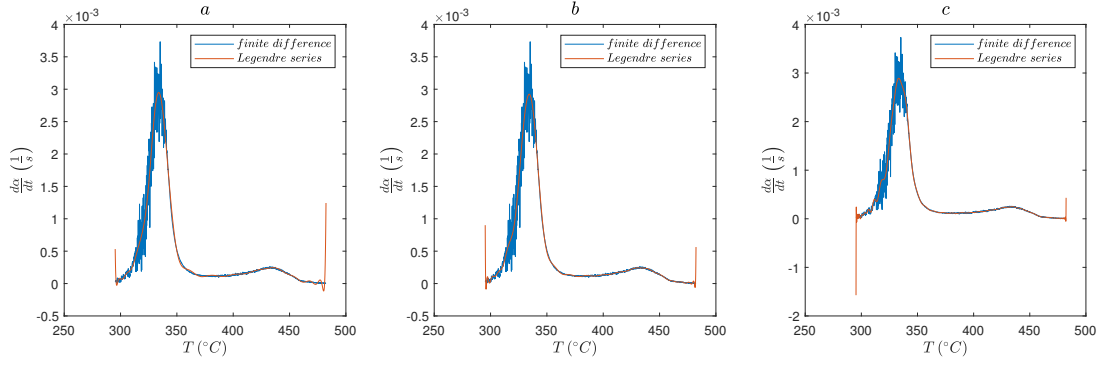


Fig. S10 The $(d\alpha/dt)$ curves of PLA/PA degradation with heating rate of $5^\circ\text{C}/\text{min}$ evaluated by application of Legendre series expansion with optimal values of N a) trapezoidal rule of integration ($N = 28$), b) Simpson's rule of integration ($N = 39$), c) Gauss-Legendre quadrature ($N = 73$).

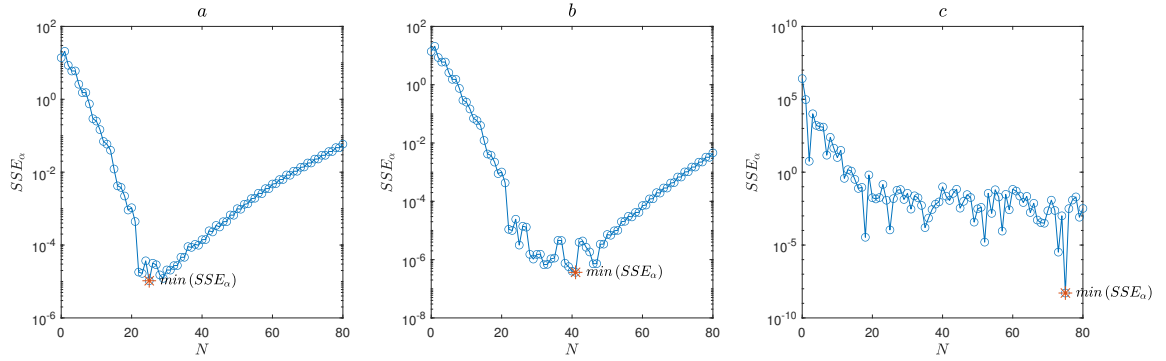


Fig. S11 Influence of N on the SSE_α of Legendre series expansion of $\alpha - T$ curve of PLA/PA degradation with heating rate of $5^\circ\text{C}/\text{min}$ using a) trapezoidal rule of integration, b) Simpson's rule of integration, c) Gauss-Legendre quadrature.

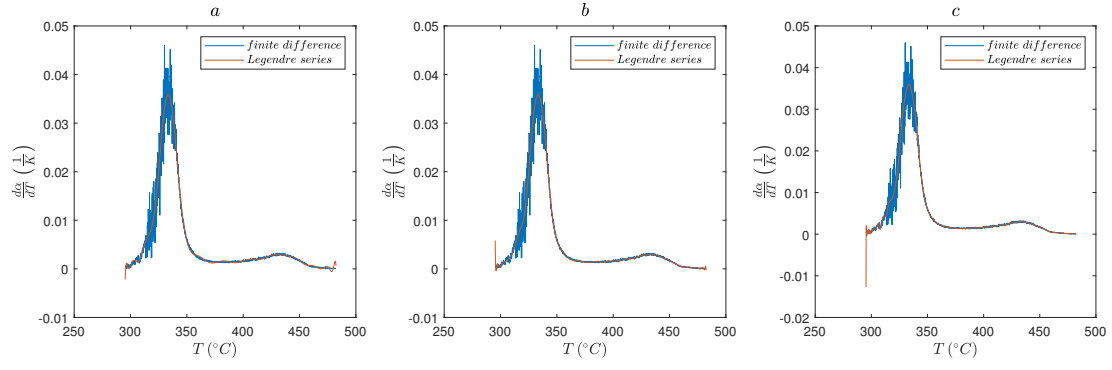


Fig. S12 The $(d\alpha/dT)$ curves of PLA/PA degradation with heating rate of $5^\circ\text{C}/\text{min}$ evaluated by application of Legendre series expansion with optimal values of N a) trapezoidal rule of integration ($N = 25$), b) Simpson's rule of integration ($N = 41$), c) Gauss-Legendre quadrature ($N = 75$).

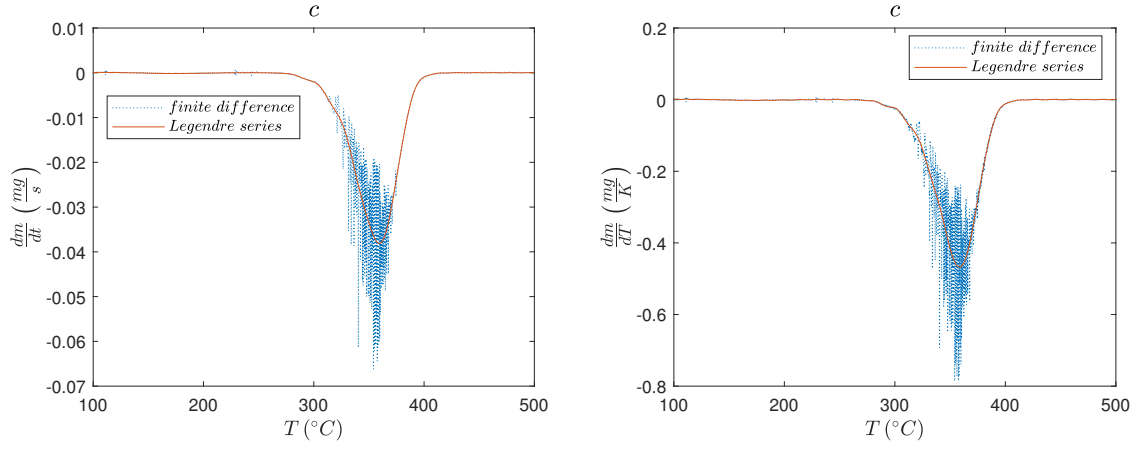


Fig. S13 The DTG curves of PMMA degradation with heating rate of $5^\circ\text{C}/\text{min}$ evaluated by application of Legendre series expansion and Gauss-Legendre quadrature method, a) dm/dt with $N = 93$, b) dm/dT with $N = 100$.

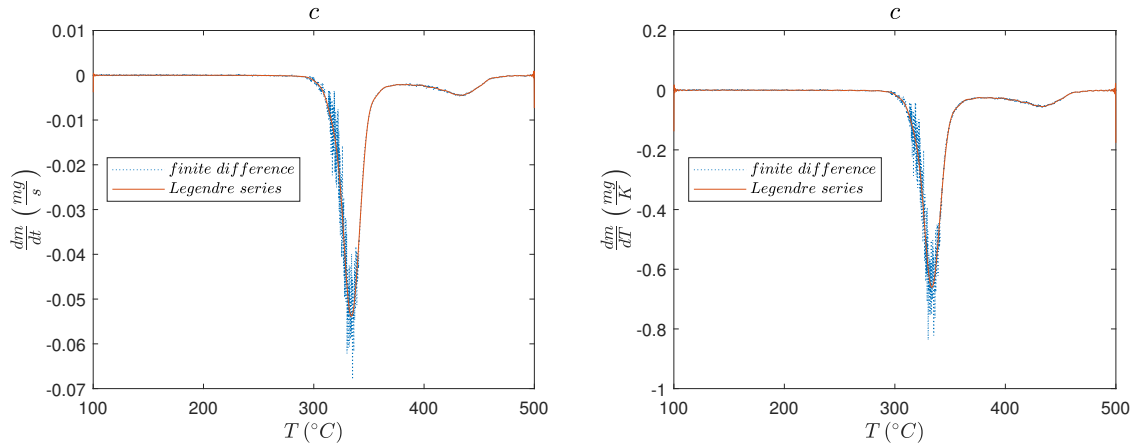


Fig. S14 The DTG curves of PLA/PA degradation with heating rate of $5^\circ\text{C}/\text{min}$ evaluated by application of Legendre series expansion and Gauss-Legendre quadrature method, a) dm/dt with $N = 99$, b) dm/dT with $N = 100$.

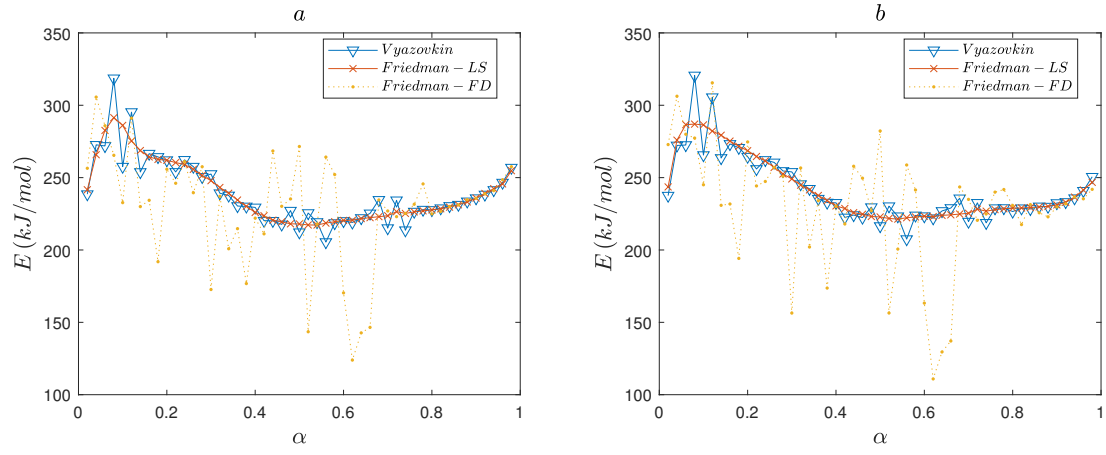


Fig. S15 Activation energies obtained from Vyazovkin method and Friedman method in conjunction with Legendre series (LS) and finite difference (FD) methods using a) $\alpha - t$ curves and b) $\alpha - T$ curves of PMMA degradation.

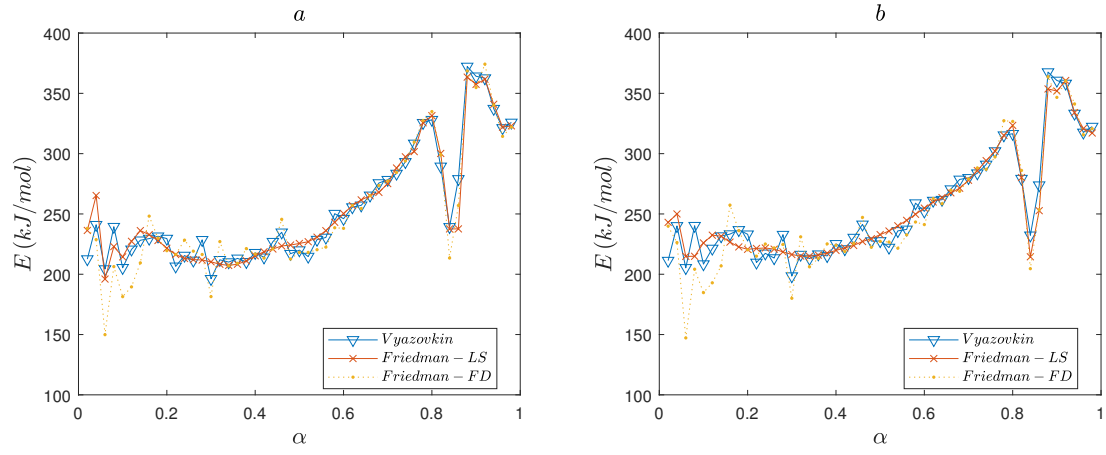


Fig. S16 Activation energies obtained from Vyazovkin method and Friedman method in conjunction with Legendre series (LS) and finite difference (FD) methods using a) $\alpha - t$ curves and b) $\alpha - T$ curves of PLA/PA degradation.