

## Supporting information

### Dynamic cross-linked Latent Accelerators Featuring Dual-Dynamic Urea Bonds for One-Component Epoxy Systems

#### contents

Supporting Figures.....	3
Fig. S1 SEM images of DICY. ....	3
Fig. S2 SEM images and statistical particle size of IEM-DtBIM-0.25.....	3
Fig. S3 SEM images and statistical particle size of IEM-DtBIM-0.50.....	4
Fig. S4 SEM images and statistical particle size of IEM-DtBIM-0.75.....	4
Fig. S5 FTIR spectra of IEM-DtBIM-x. ....	4
Fig. S6 Dissolution experiment of IEM-DtBIM-0.25 in different solvents at room temperature for 0 day.....	5
Fig. S7 Dissolution experiment of IEM-DtBIM-0.50 in different solvents at room temperature for 0 day.....	5
Fig. S8 Dissolution experiment of IEM-DtBIM-0.75 in different solvents at room temperature for 0 day.....	5
Fig. S9 Dissolution experiment of IEM-DtBIM-0.25 in different solvents at room temperature for 45 days. ..	5
Fig. S10 Dissolution experiment of IEM-DtBIM-0.50 in different solvents at room temperature for 45 days. 6	6
Fig. S11 Dissolution experiment of IEM-DtBIM-0.75 in different solvents at room temperature for 45 days. 6	6
Fig. S12 Storage modulus and loss modulus of E-D-IM under non-isothermal rheology.....	6
Fig. S13 Storage modulus and loss modulus of E-D-ID0.25 under non-isothermal rheology. ....	7
Fig. S14 Storage modulus and loss modulus of E-D-ID0.50 under non-isothermal rheology. ....	7
Fig. S15 Storage modulus and loss modulus of E-D-ID0.75 under non-isothermal rheology. ....	7
Fig. S16 Storage modulus and loss modulus of E-D under non-isothermal rheology.....	8
Fig. S17 Cross-linking degree of E-D-ID0.25 calculated from isothermal DSC curves at different temperatures for 60 min. ....	8
Fig. S18 Cross-linking degree of E-D-ID0.50 calculated from isothermal DSC curves at different temperatures for 60 min. ....	9
Fig. S19 Cross-linking degree of E-D-ID0.75 calculated from isothermal DSC curves at different temperatures for 60 min. ....	9
Fig. S20 Complex viscosity of E-D-ID0.25 after different storage times at room temperature. ....	10

Fig. S21 Complex viscosity of E-D-ID0.50 after different storage times at room temperature. ....	11
Fig. S22 Complex viscosity of E-D-ID0.75 after different storage times at room temperature. ....	12
Fig. S23 Non-isothermal DSC curves of E-D-ID0.25 are obtained by pre-curing at 120 °C for 0.5 h, followed by hot pressing at 130 °C for 0.5 h, and post-curing in a vacuum furnace at 150 °C for 1-3 h. ....	13
Fig. S24 Non-isothermal DSC curves of E-D-ID0.75 are obtained by pre-curing at 120 °C for 0.5 h, followed by hot pressing at 130 °C for 0.5 h, and post-curing in a vacuum furnace at 150 °C for 1-3 h. ....	13
Fig. S25 Non-isothermal DSC curves of E-D-IM for different heating rates. ....	14
Fig. S26 Non-isothermal DSC curves of E-D-ID0.25 for different heating rates. ....	14
Fig. S27 Non-isothermal DSC curves of E-D-ID0.50 for different heating rates. ....	15
Fig. S28 Non-isothermal DSC curves of E-D-ID0.75 for different heating rates. ....	15
Fig. S29 Predicted $E_a$ of D-D-IM by <i>Kissinger's</i> and <i>Ozawa's</i> methods. ....	15
Fig. S30 Predicted $E_a$ of E-D-ID0.25 by <i>Kissinger's</i> and <i>Ozawa's</i> methods. ....	16
Fig. S31 Predicted $E_a$ of E-D-ID0.50 by <i>Kissinger's</i> and <i>Ozawa's</i> methods. ....	16
Fig. S32 Predicted $E_a$ of E-D-ID0.75 by <i>Kissinger's</i> and <i>Ozawa's</i> methods. ....	16
Fig. S33 FTIR spectra of the cured E-D-IM and E-D-IDx. ....	17
Fig. S34 Solvent uptake test of E-D-IM and E-D-IDx by immersion in different solvents for 48 h. ....	17
Fig. S35 Plot of $\tan \delta$ versus temperature. ....	18
Fig. S36 Plot of storage modulus versus temperature. ....	18
Fig. S37 Tensile stress-strain curves of E-D-IM. ....	19
Fig. S38 Tensile stress-strain curves of E-D-ID0.25. ....	19
Fig. S39 Tensile stress-strain curves of E-D-ID0.50. ....	19
Fig. S40 Tensile stress-strain curves of E-D-ID0.75. ....	20

## Supporting Figures

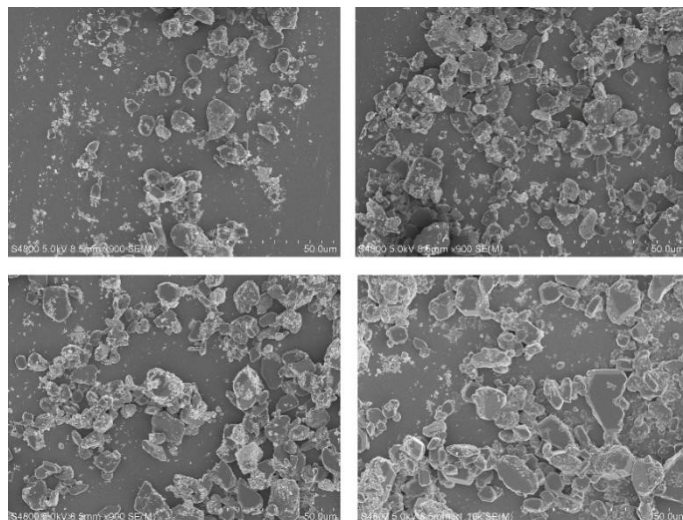


Fig. S1 SEM images of DICY.

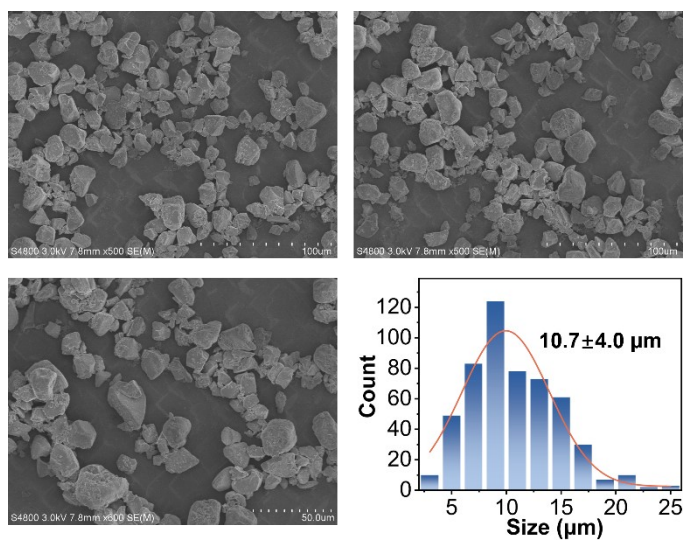


Fig. S2 SEM images and statistical particle size of IEM-DtBIM-0.25.

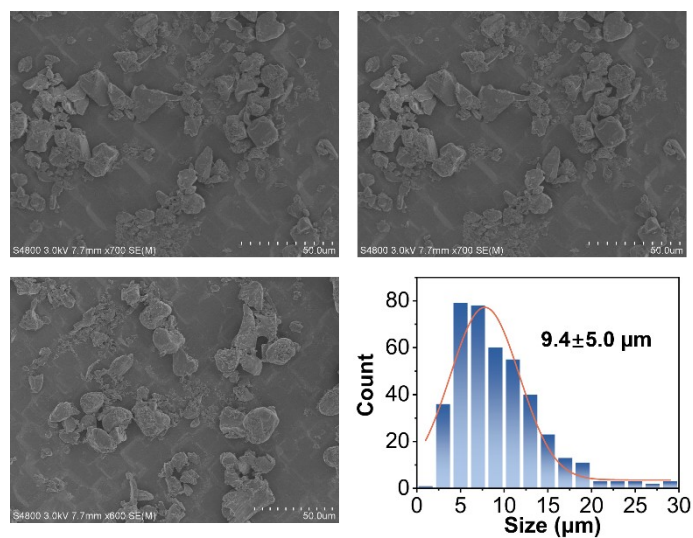


Fig. S3 SEM images and statistical particle size of IEM-DtBIM-0.50.

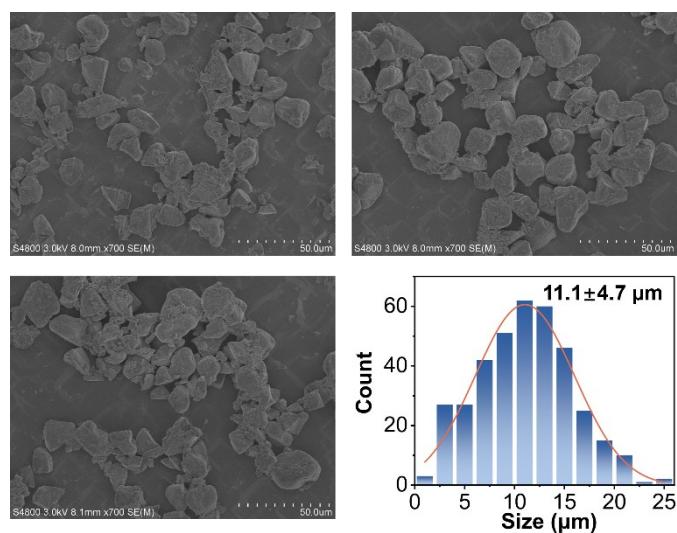


Fig. S4 SEM images and statistical particle size of IEM-DtBIM-0.75.

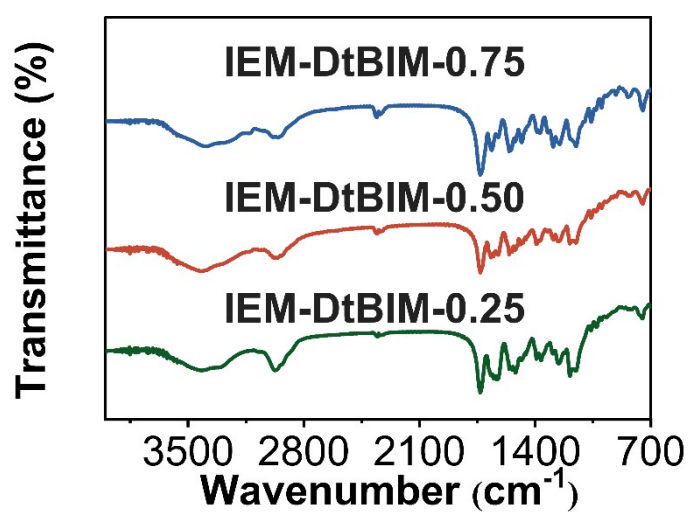


Fig. S5 FTIR spectra of IEM-DtBIM-x.



Fig. S6 Dissolution experiment of IEM-DtBIM-0.25 in different solvents at room temperature for 0 day.



Fig. S7 Dissolution experiment of IEM-DtBIM-0.50 in different solvents at room temperature for 0 day.



Fig. S8 Dissolution experiment of IEM-DtBIM-0.75 in different solvents at room temperature for 0 day.



Fig. S9 Dissolution experiment of IEM-DtBIM-0.25 in different solvents at room temperature for 45 days.



Fig. S10 Dissolution experiment of IEM-DtBIM-0.50 in different solvents at room temperature for 45 days.



Fig. S11 Dissolution experiment of IEM-DtBIM-0.75 in different solvents at room temperature for 45 days.

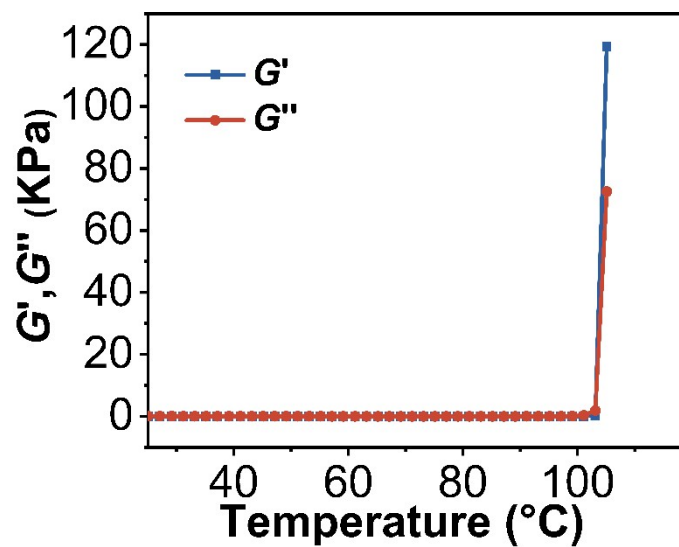


Fig. S12 Storage modulus and loss modulus of E-D-IM under non-isothermal rheology.

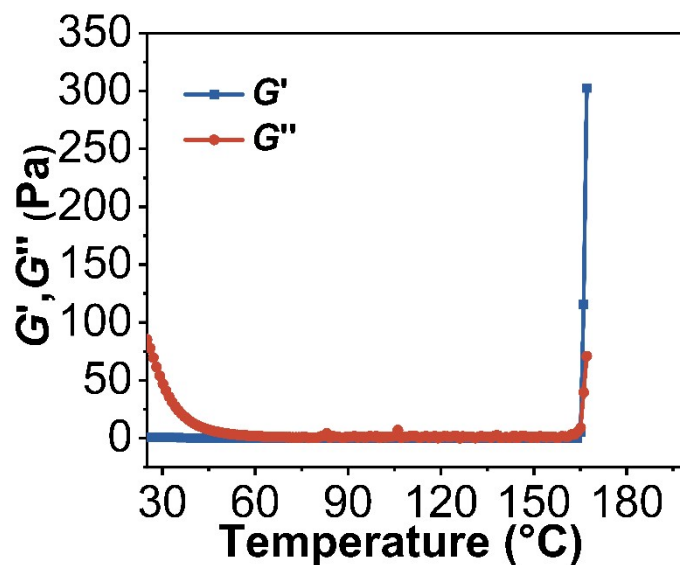


Fig. S13 Storage modulus and loss modulus of E-D-ID0.25 under non-isothermal rheology.

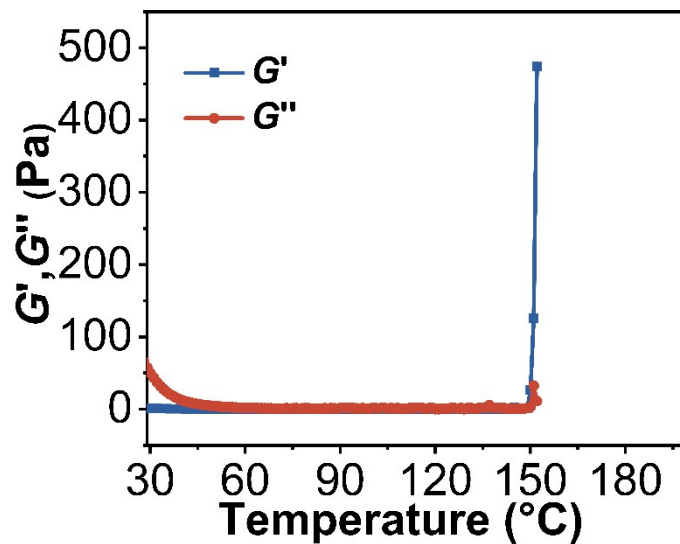


Fig. S14 Storage modulus and loss modulus of E-D-ID0.50 under non-isothermal rheology.

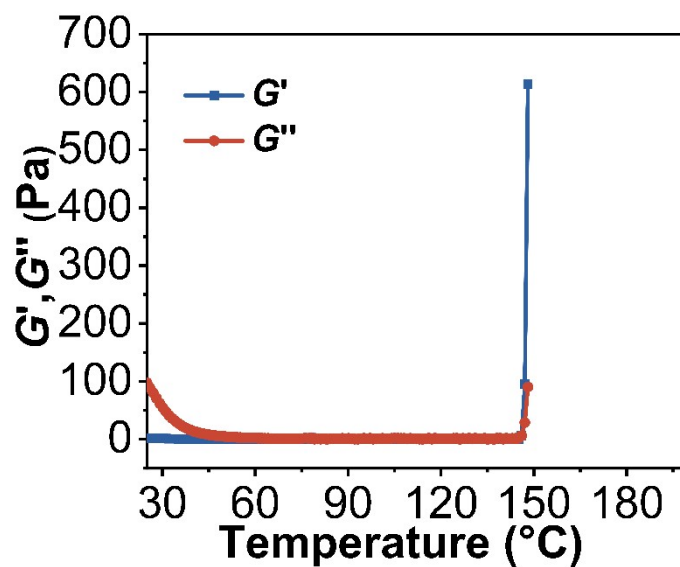


Fig. S15 Storage modulus and loss modulus of E-D-ID0.75 under non-isothermal rheology.

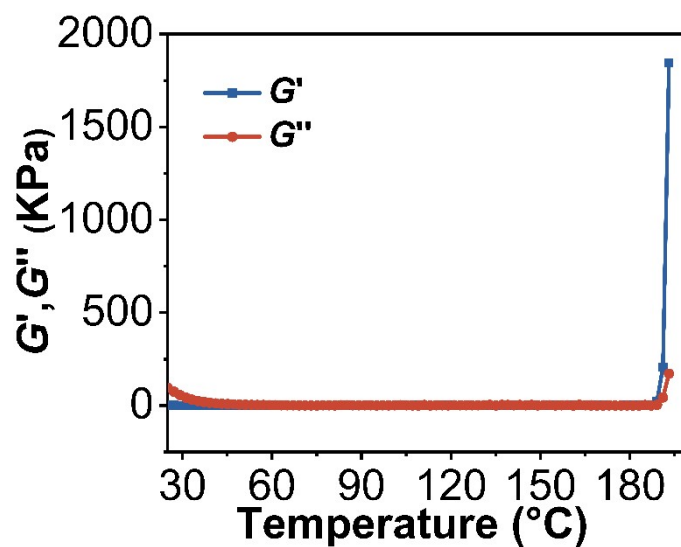


Fig. S16 Storage modulus and loss modulus of E-D under non-isothermal rheology.

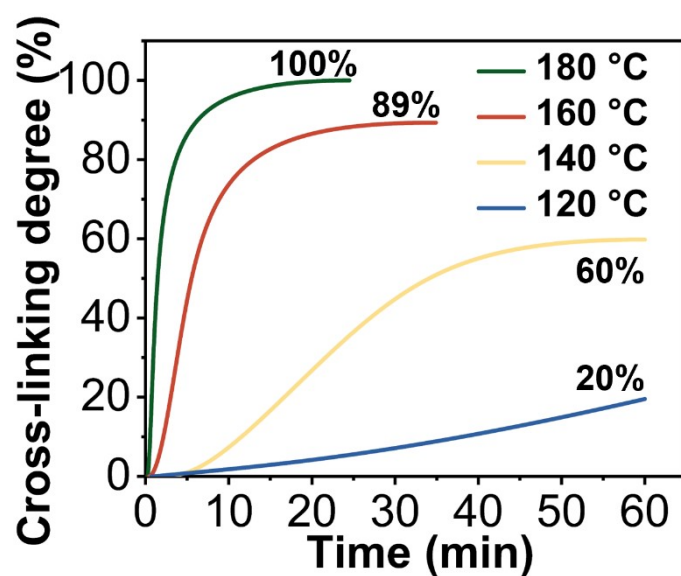


Fig. S17 Cross-linking degree of E-D-ID0.25 calculated from isothermal DSC curves at different temperatures for 60 min.

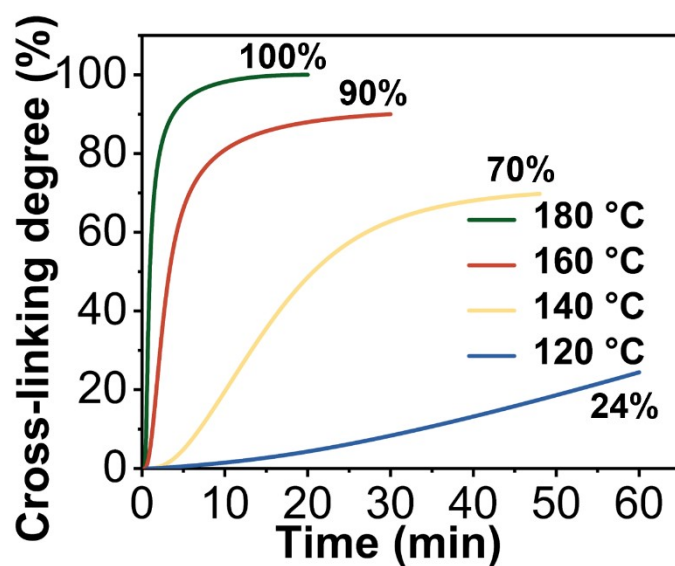


Fig. S18 Cross-linking degree of E-D-ID0.50 calculated from isothermal DSC curves at different temperatures for 60 min.

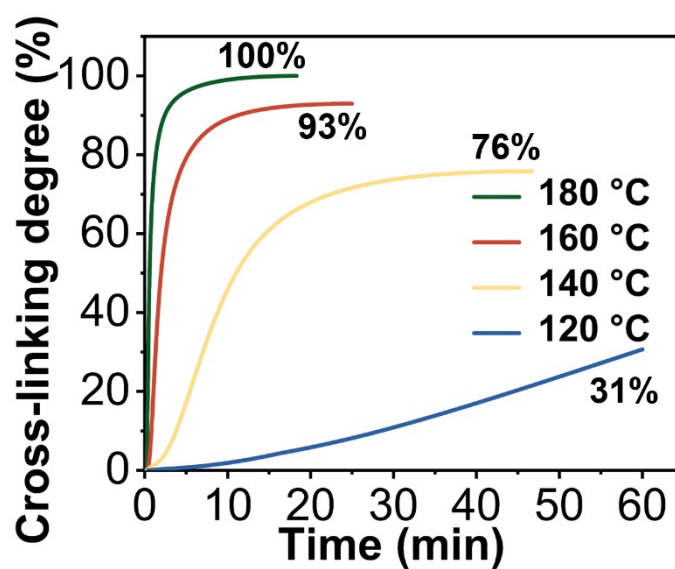


Fig. S19 Cross-linking degree of E-D-ID0.75 calculated from isothermal DSC curves at different temperatures for 60 min.

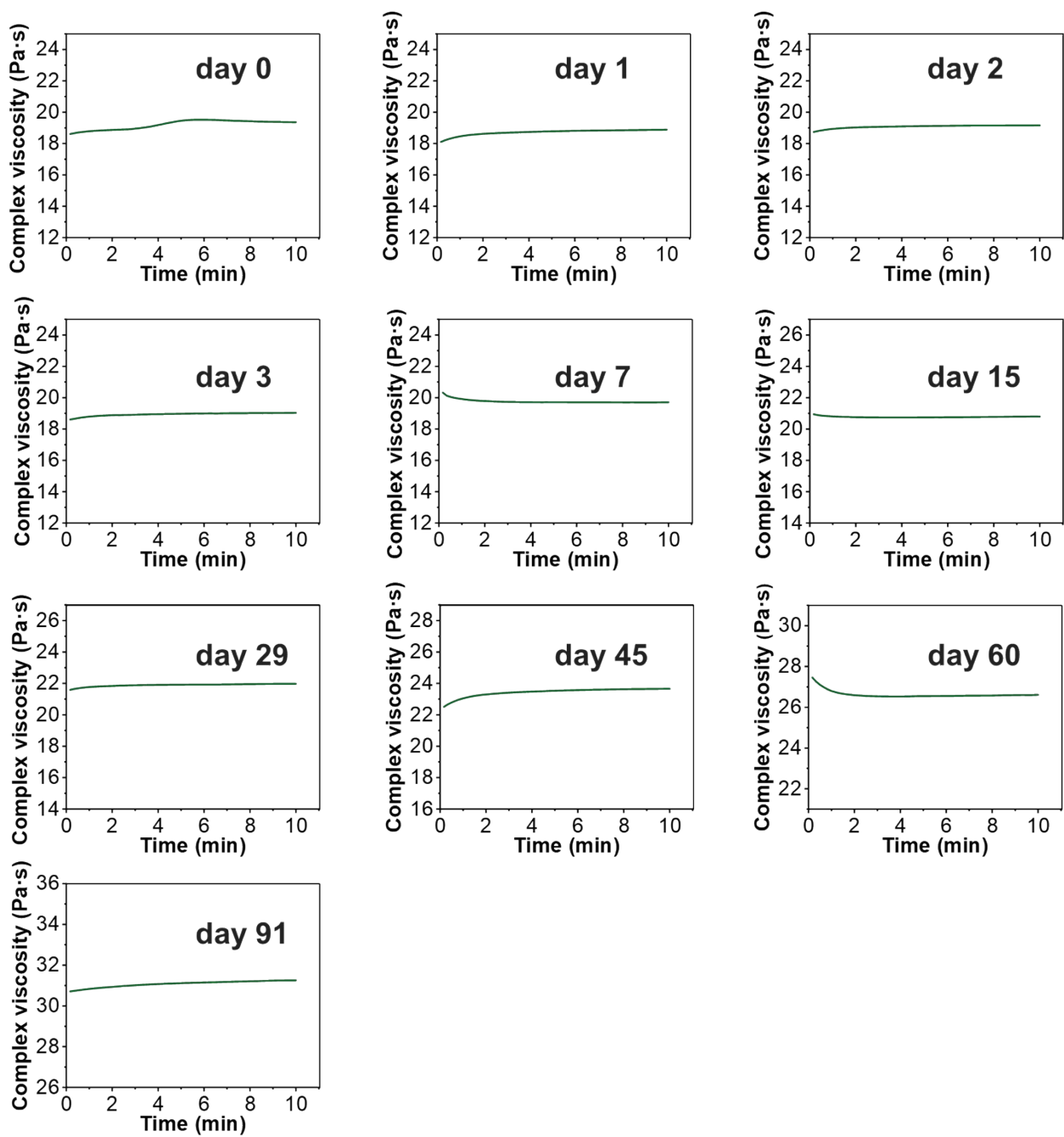


Fig. S20 Complex viscosity of E-D-ID0.25 after different storage times at room temperature.

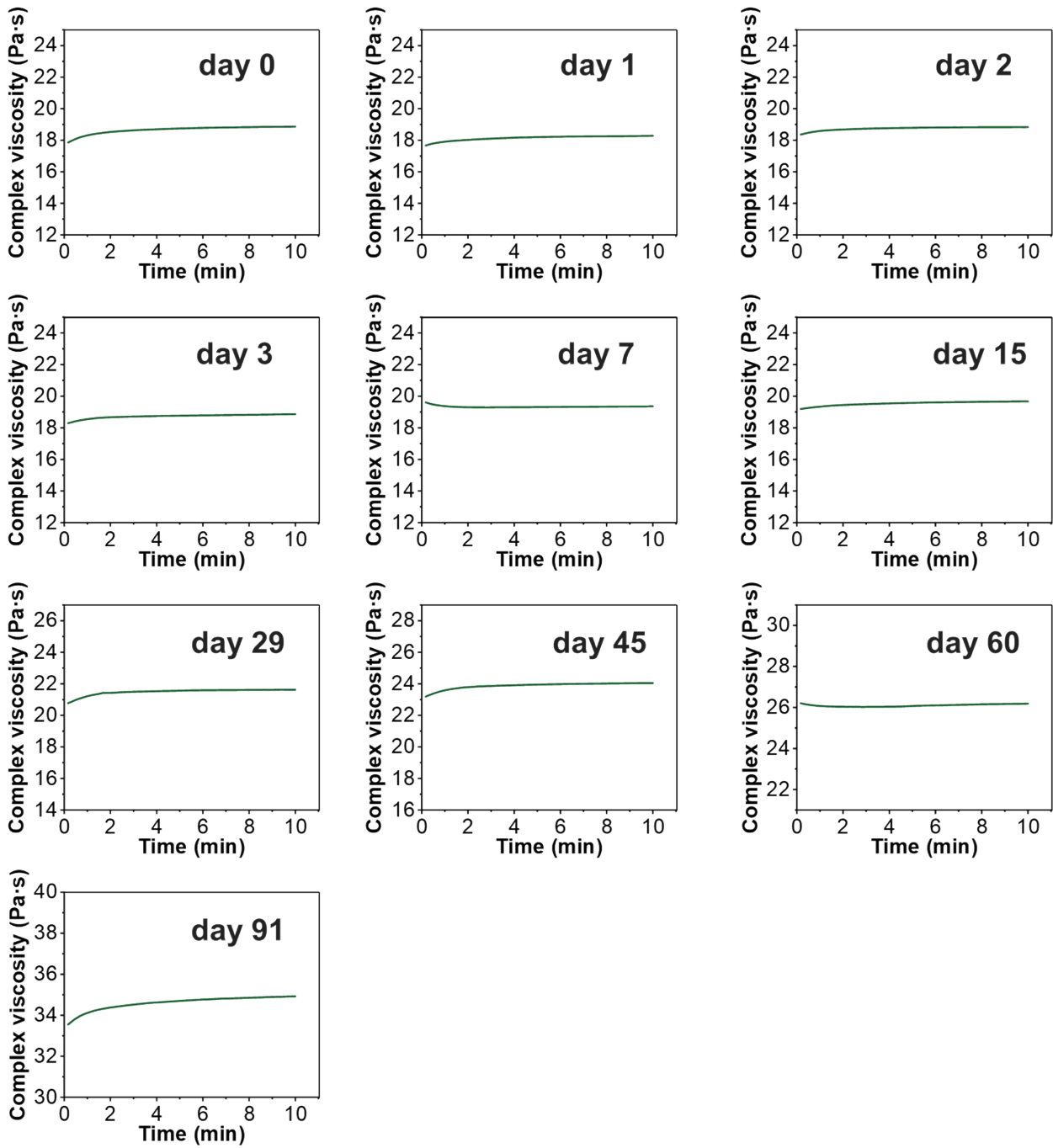


Fig. S21 Complex viscosity of E-D-ID0.50 after different storage times at room temperature.

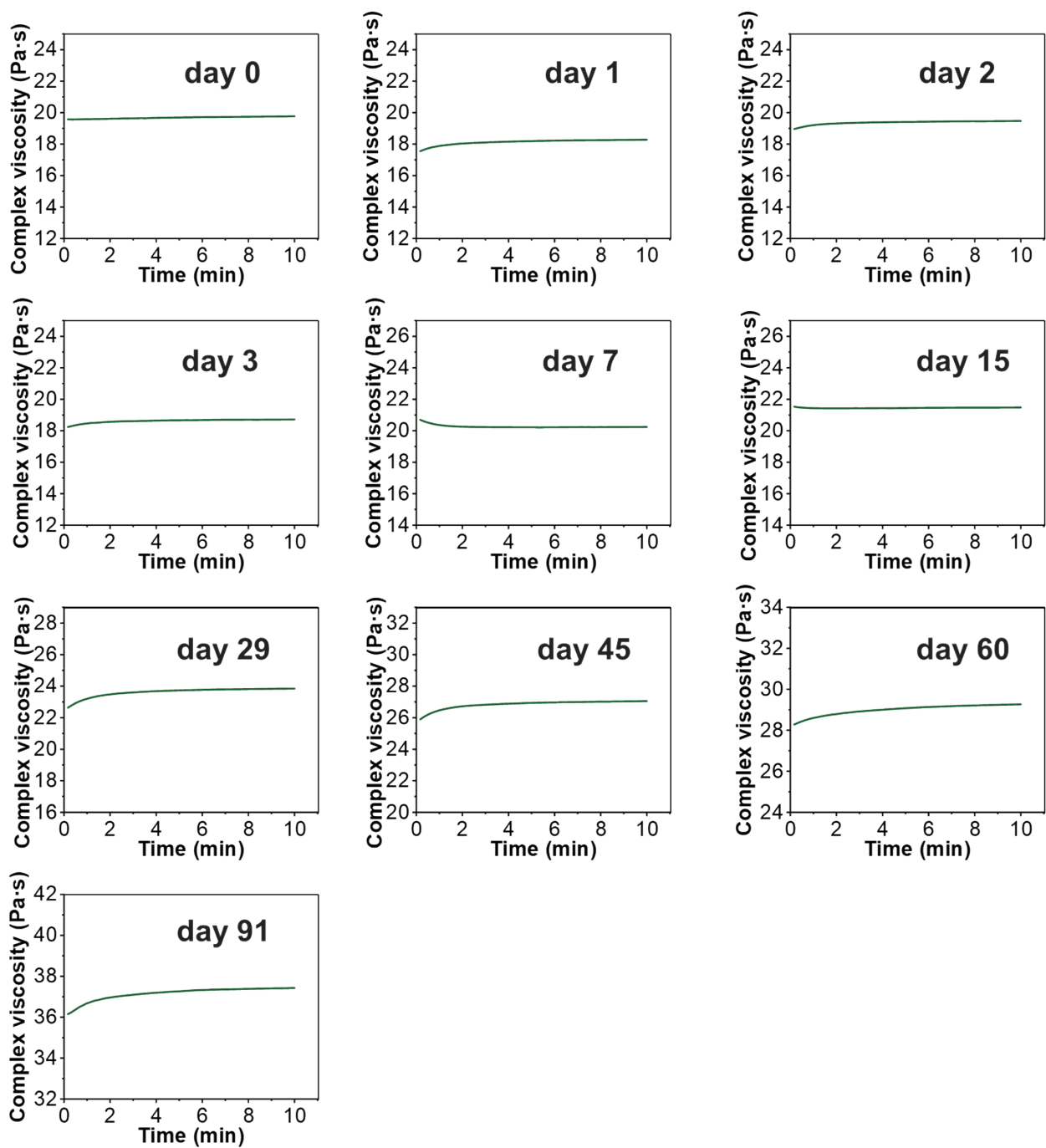


Fig. S22 Complex viscosity of E-D-ID0.75 after different storage times at room temperature.

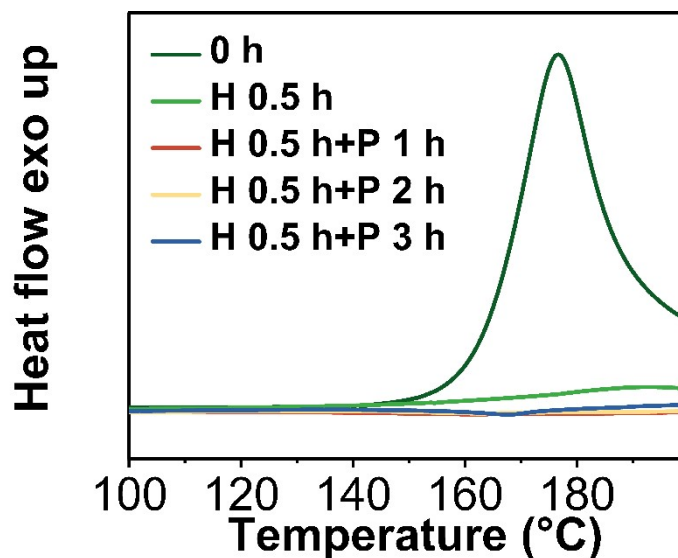


Fig. S23 Non-isothermal DSC curves of E-D-ID0.25 are obtained by pre-curing at 120 °C for 0.5 h, followed by hot pressing at 130 °C for 0.5 h, and post-curing in a vacuum furnace at 150 °C for 1-3 h.

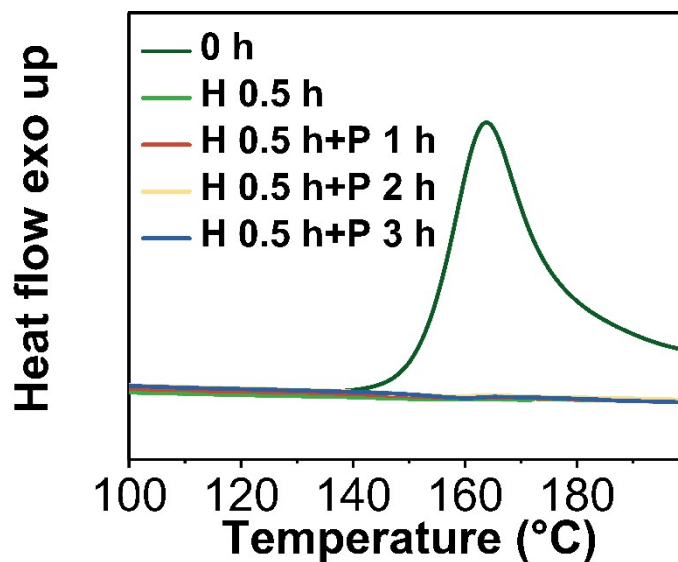


Fig. S24 Non-isothermal DSC curves of E-D-ID0.75 are obtained by pre-curing at 120 °C for 0.5 h, followed by hot pressing at 130 °C for 0.5 h, and post-curing in a vacuum furnace at 150 °C for 1-3 h.

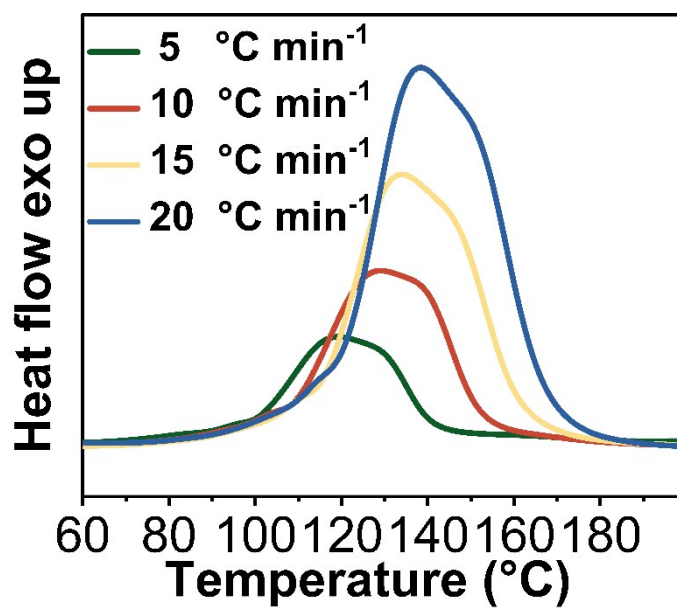


Fig. S25 Non-isothermal DSC curves of E-D-IM for different heating rates.

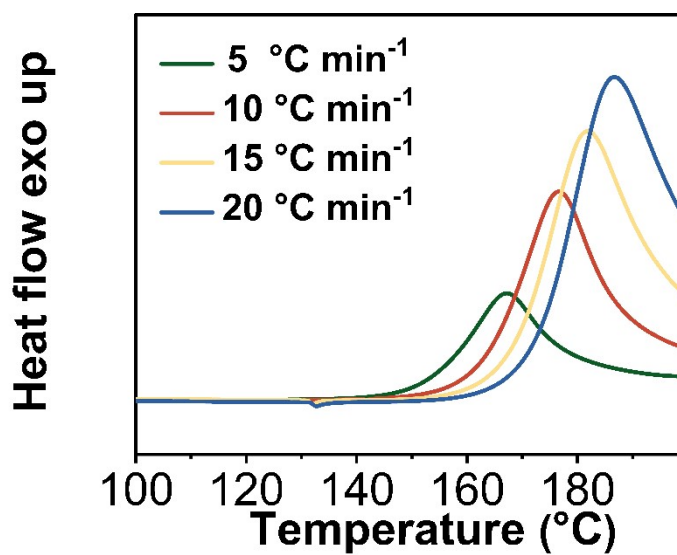


Fig. S26 Non-isothermal DSC curves of E-D-ID0.25 for different heating rates.

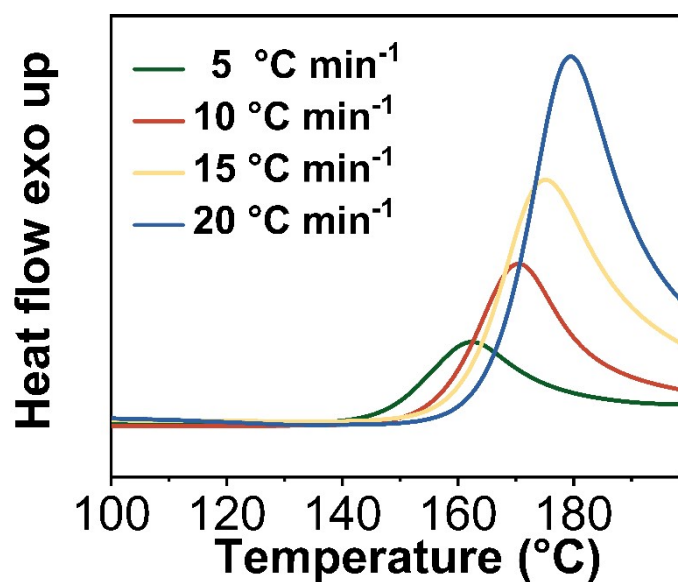


Fig. S27 Non-isothermal DSC curves of E-D-ID0.50 for different heating rates.

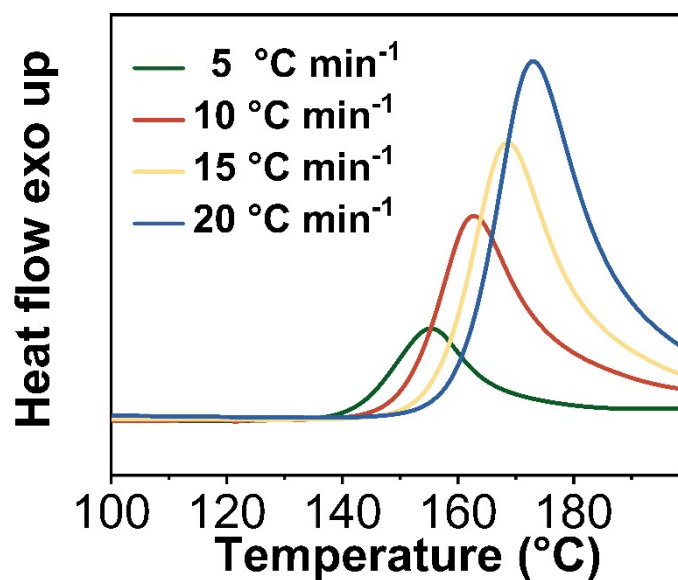


Fig. S28 Non-isothermal DSC curves of E-D-ID0.75 for different heating rates.

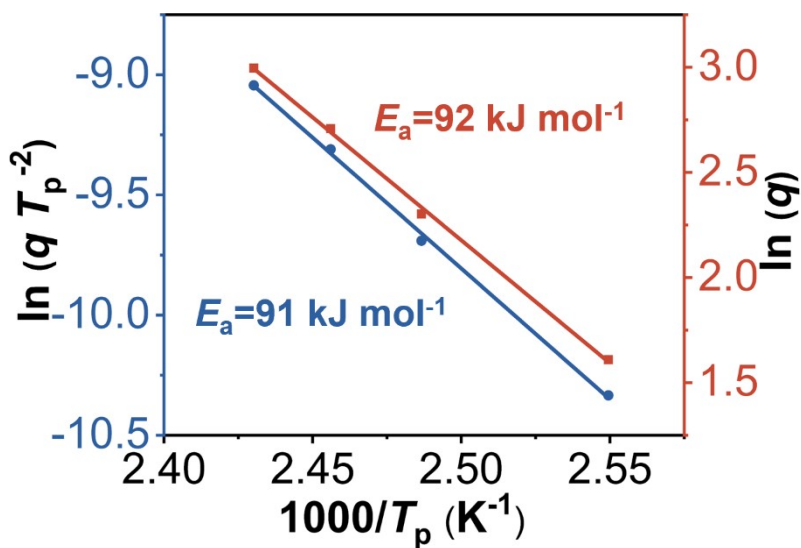


Fig. S29 Predicted  $E_a$  of D-D-IM by Kissinger's and Ozawa's methods.

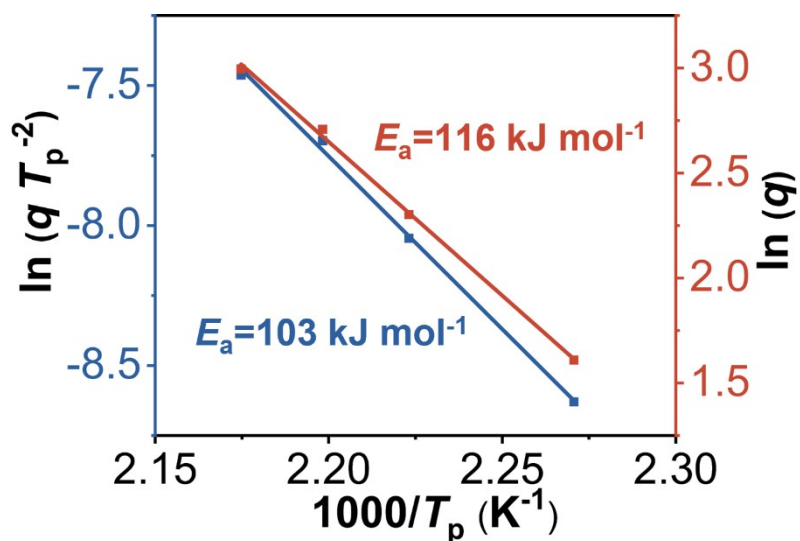


Fig. S30 Predicted  $E_a$  of E-D-ID0.25 by *Kissinger's* and *Ozawa's* methods.

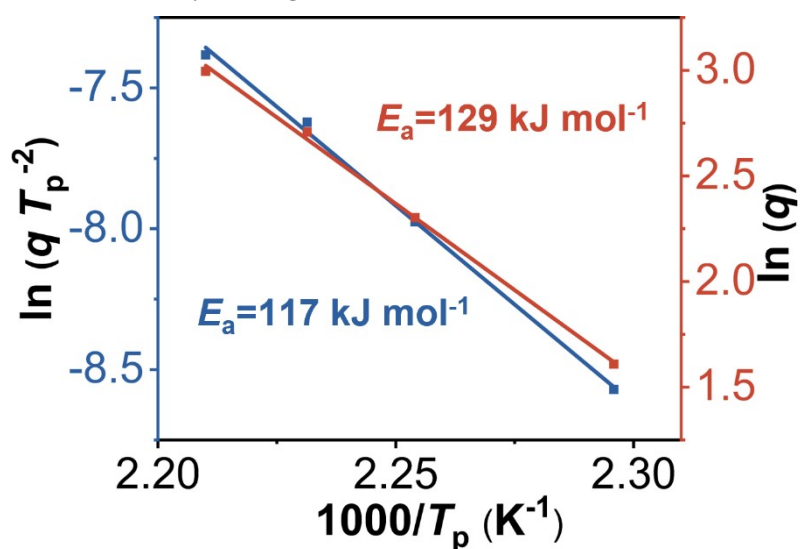


Fig. S31 Predicted  $E_a$  of E-D-ID0.50 by *Kissinger's* and *Ozawa's* methods.

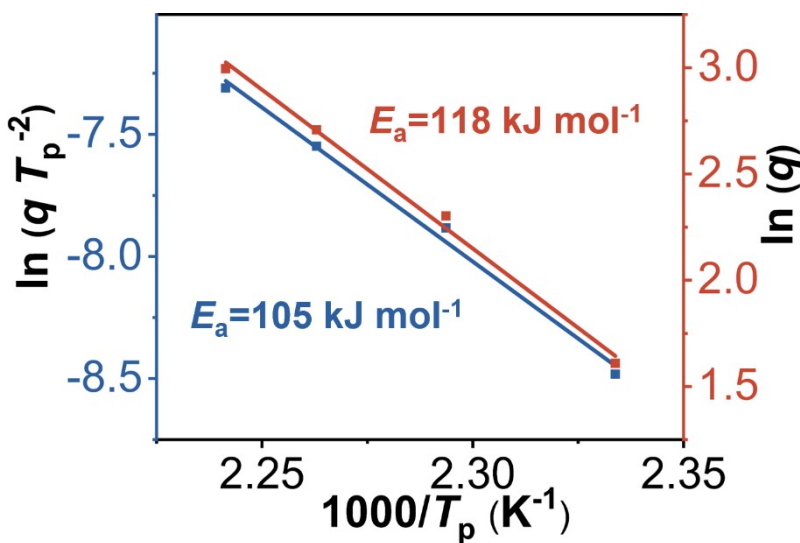


Fig. S32 Predicted  $E_a$  of E-D-ID0.75 by *Kissinger's* and *Ozawa's* methods.

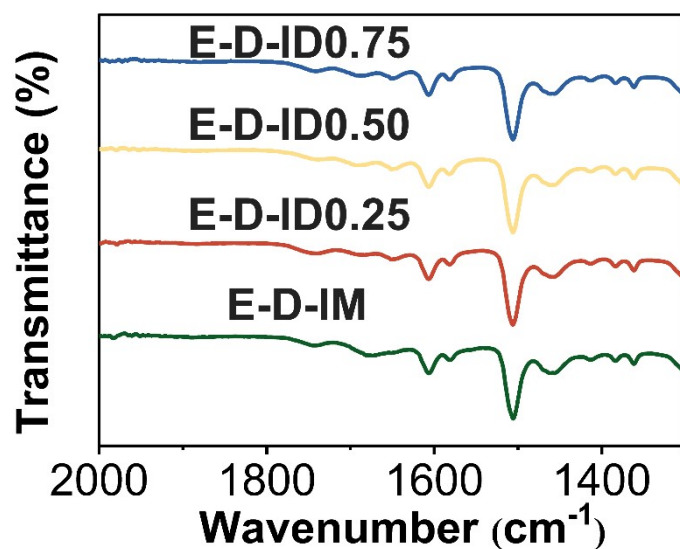


Fig. S33 FTIR spectra of the cured E-D-IM and E-D-IDx.

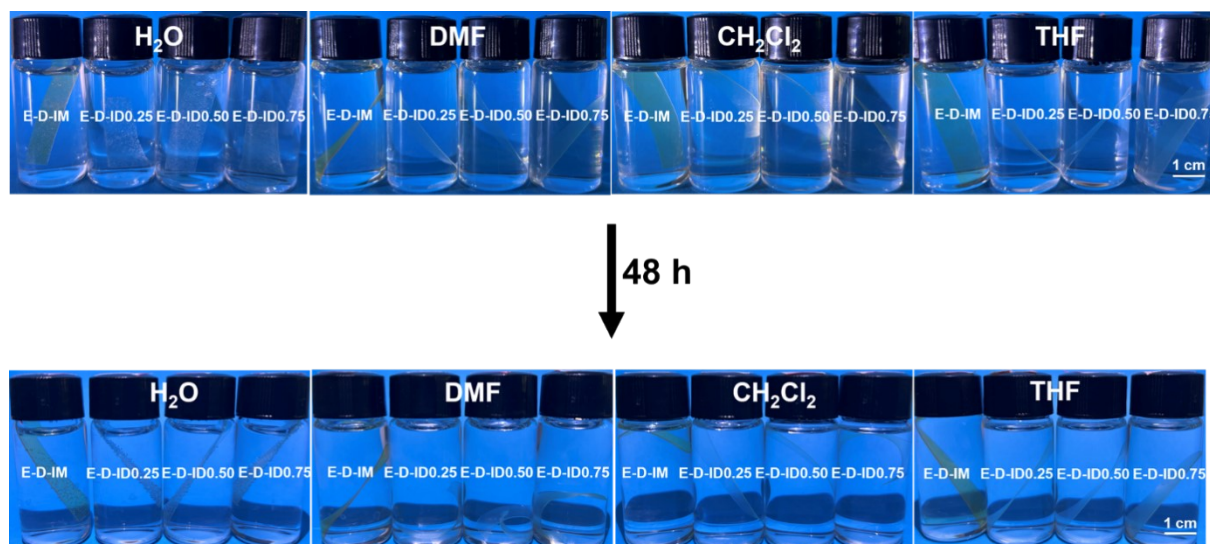


Fig. S34 Solvent uptake test of E-D-IM and E-D-IDx by immersion in different solvents for 48 h.

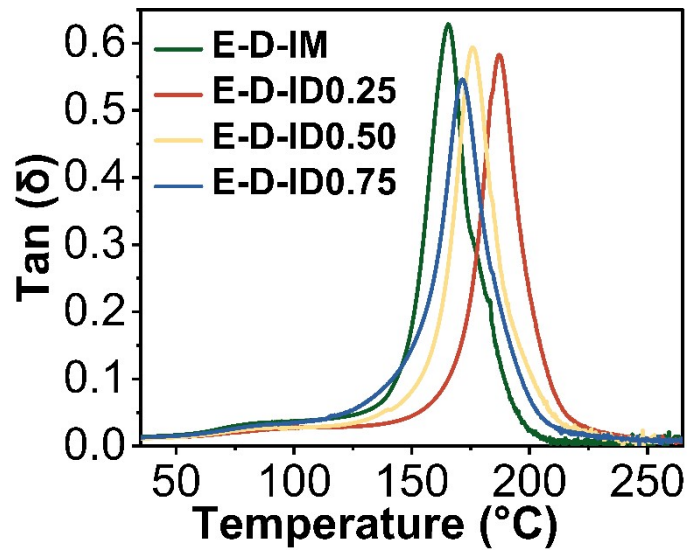


Fig. S35 Plot of  $\tan \delta$  versus temperature.

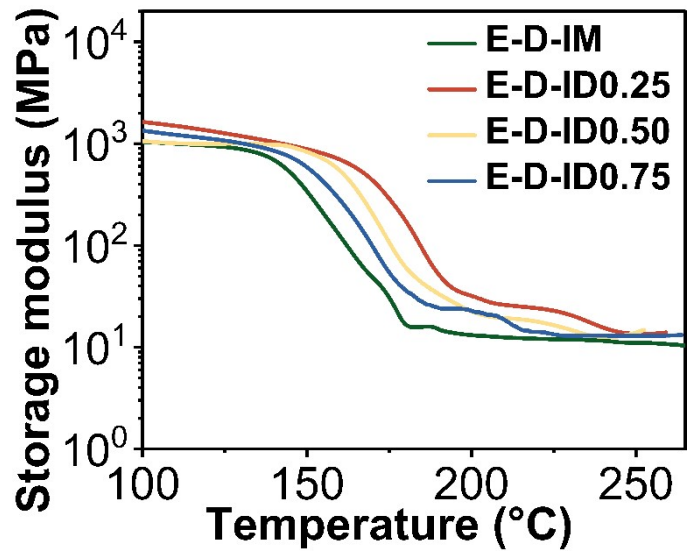


Fig. S36 Plot of storage modulus versus temperature.

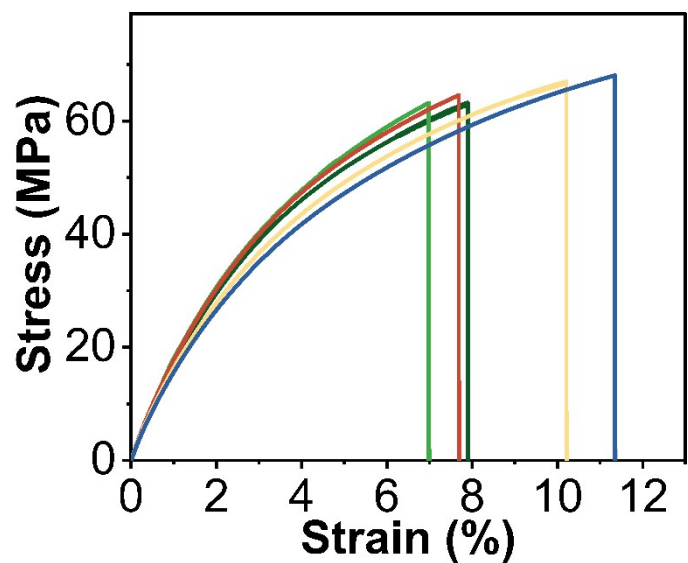


Fig. S37 Tensile stress-strain curves of E-D-IM.

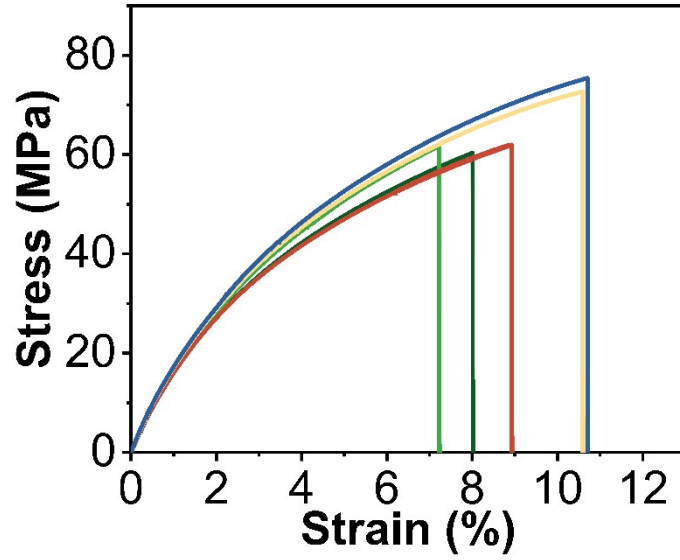


Fig. S38 Tensile stress-strain curves of E-D-ID0.25.

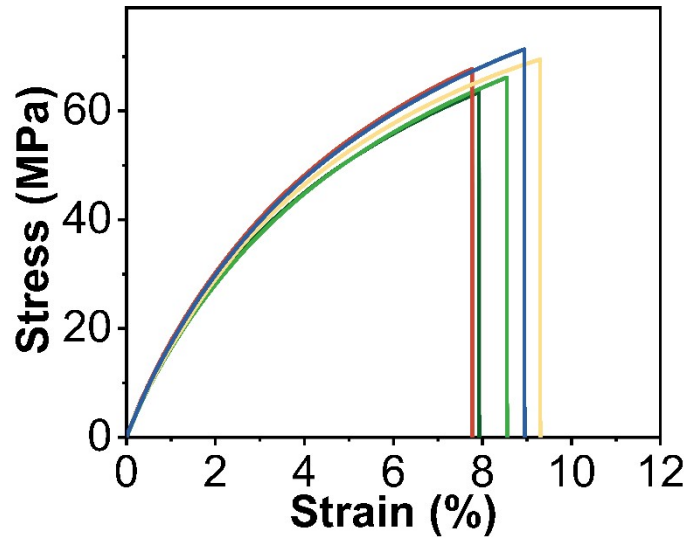


Fig. S39 Tensile stress-strain curves of E-D-ID0.50.

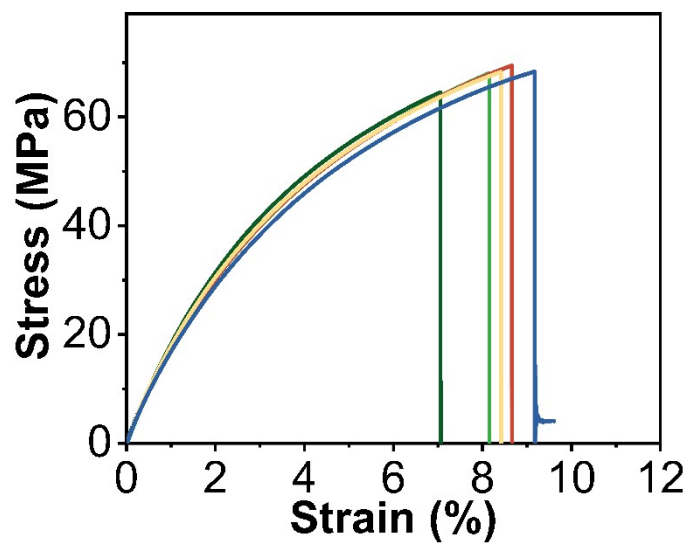


Fig. S40 Tensile stress-strain curves of E-D-ID0.75.

