

Supporting Information

**High stretchability, high room temperature self-healing efficiency
polyurethane adhesive based on hydrogen bond - can be applied to
solid rocket propellant**

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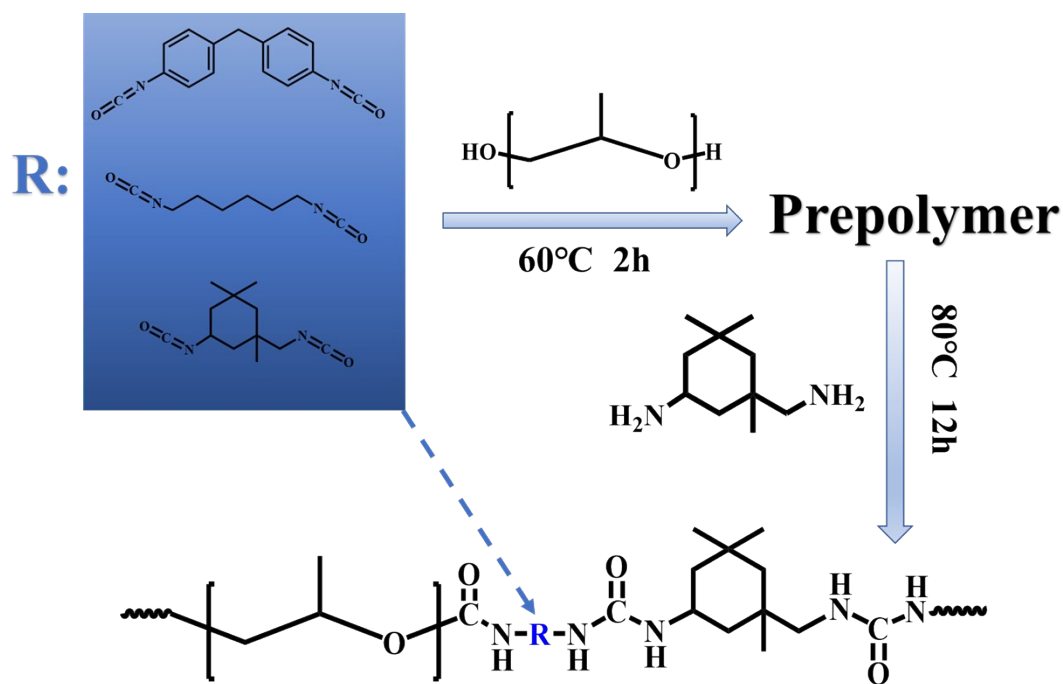


Fig. S1 The chemical structure of substances synthesized in different steps.

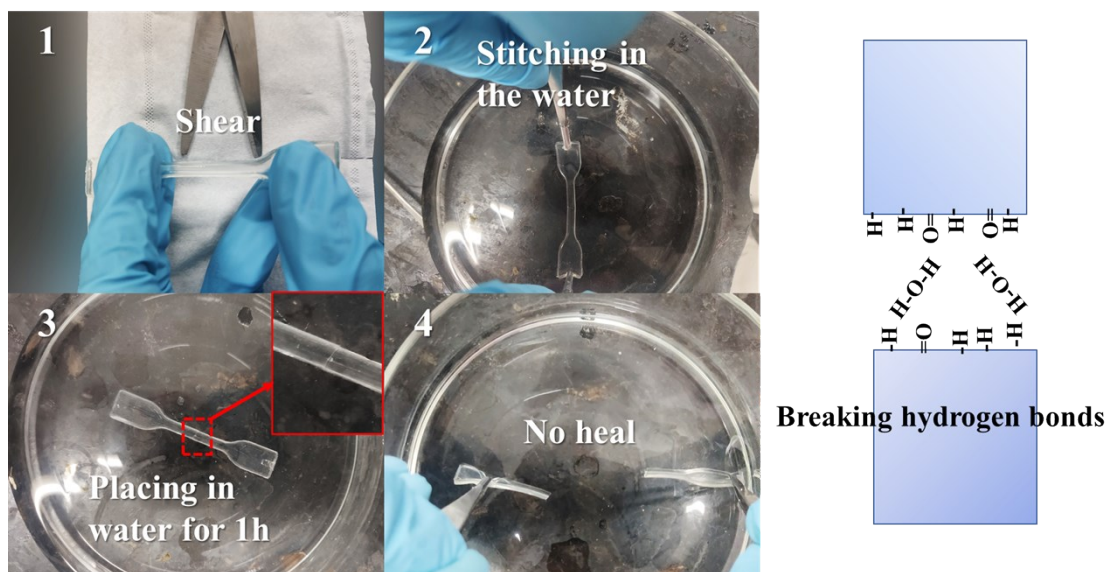


Fig. S2 The poor self-healing ability of PPG-IP-PA in water.

Table.S1 Molecular weight information of PPG-HD-PA, PPG-IP-PA, PPG-MD-PA.

	Mn (*10 ⁴ g/mol)	Mw (*10 ⁴ g/mol)	PD (Mw/Mn)
PPG-HD-PA	6.5	13.6	2.09
PPG-IP-PA	3.4	6.0	1.78
PPG-MD-PA	5.6	12.5	2.24

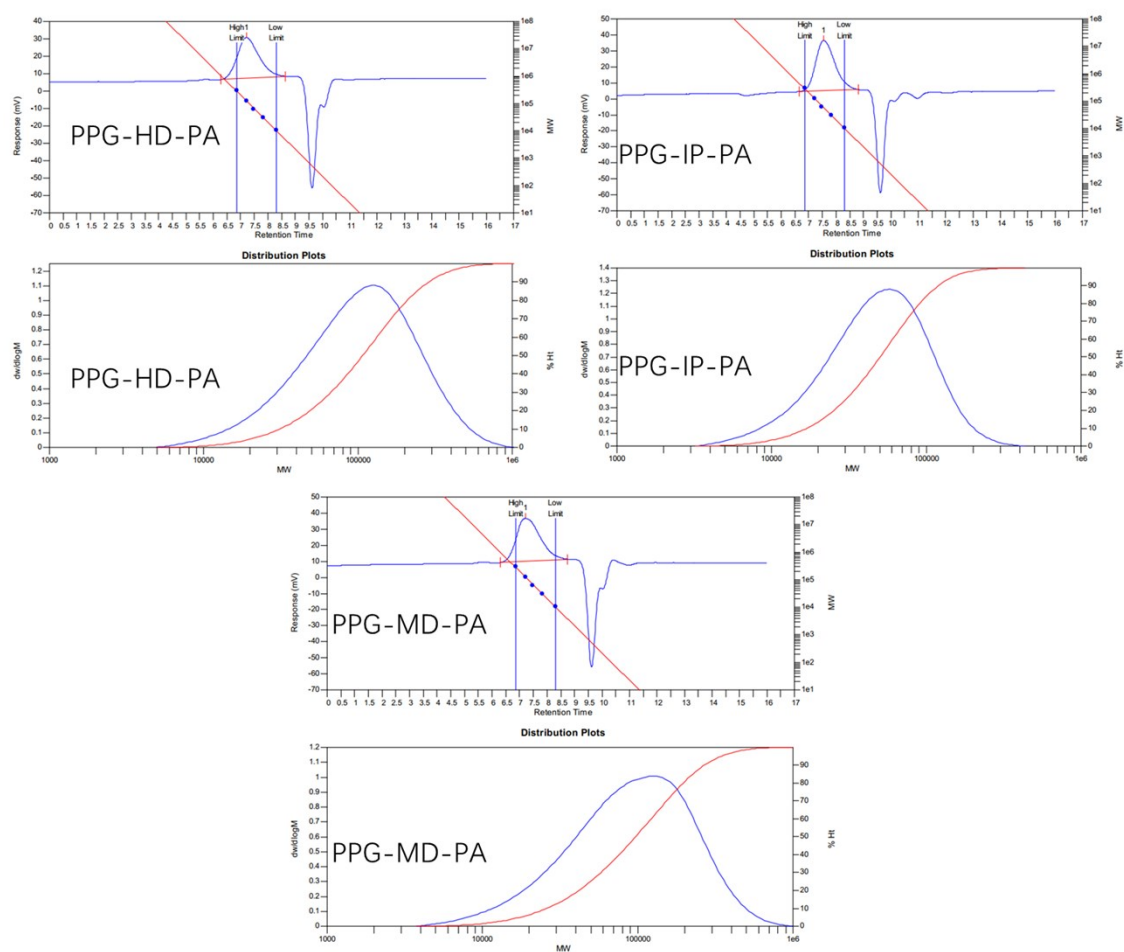


Fig. S3 GPC results of PPG-HD-PA, PPG-IP-PA, PPG-MD-PA.

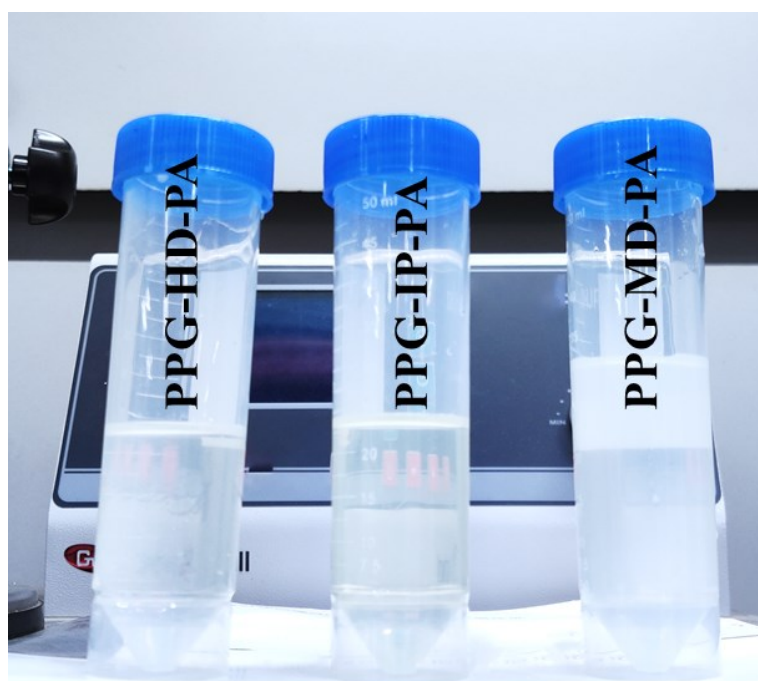


Fig. S4 The DMF solution of PPG-HD-PA, PPG-IP-PA, PPG-MD-PA.

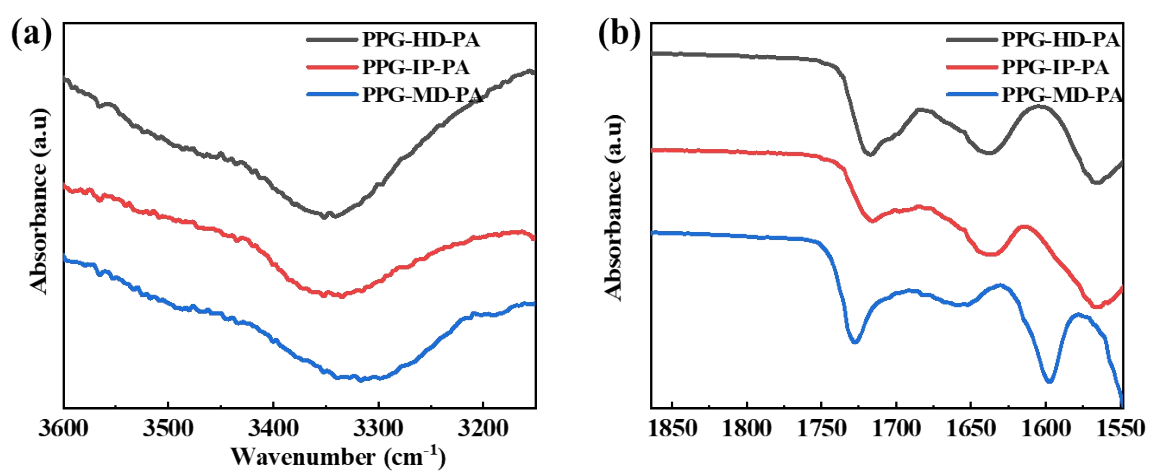


Fig. S5 Infrared vibration details of PPG-HD-PA, PPG-IP-PA, PPG-MD-PA in about 3300 cm^{-1} and 1650-1720 cm^{-1} .

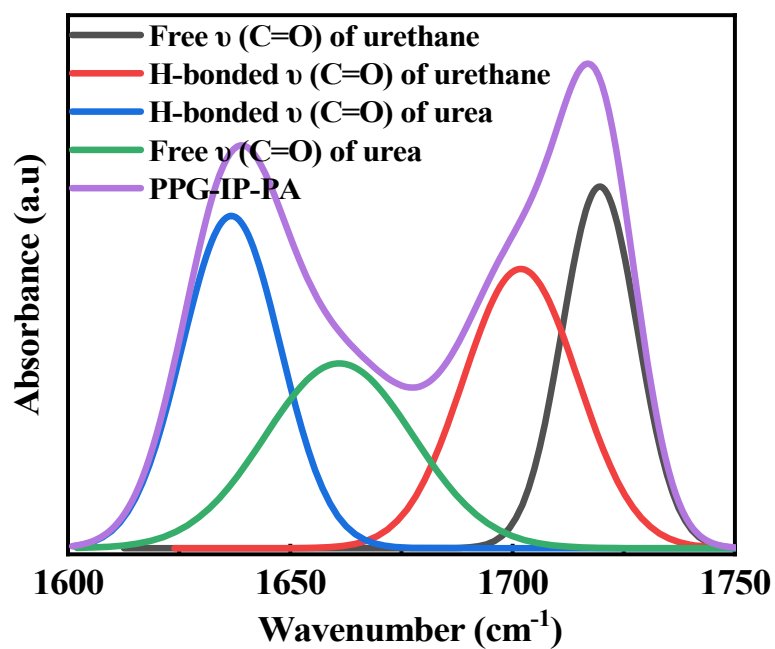


Fig. S6 The influence of PPG-IP-PA hydrogen bond on C=O Stretching vibration.

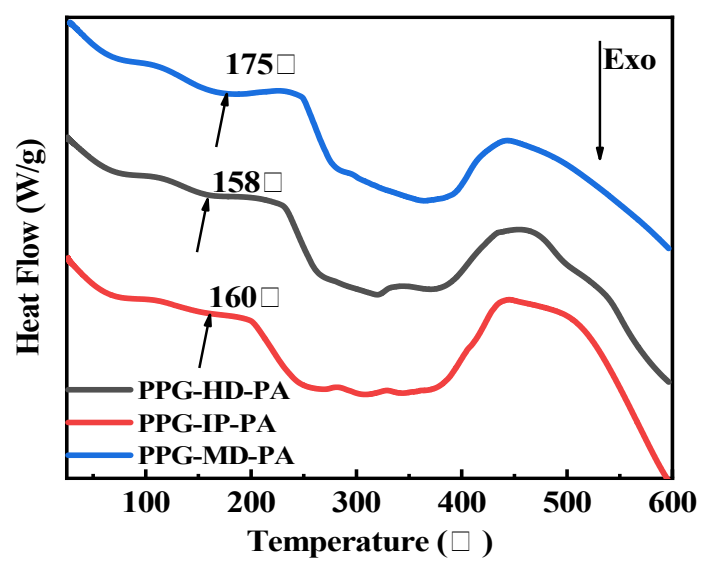


Fig. S7 DSC curves of three polyurethanes.

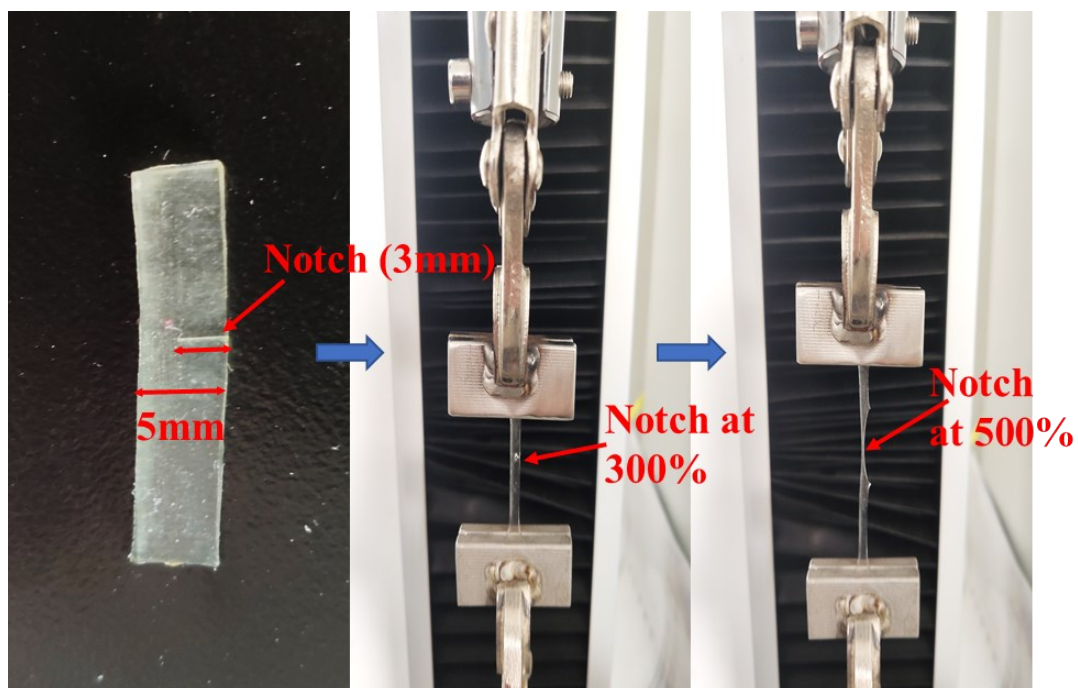


Fig. S8 PPG-IP-PA was insensitive for the wound.

Code	Paper title
A	Superior toughness and fast self-healing at room temperature engineered by transparent elastomers (<i>Advanced Materials</i>)
B	Transparent, mechanically strong, extremely tough, self-recoverable, healable supramolecular elastomers facilely fabricated via dynamic hard domains design for multifunctional applications (<i>Advanced Functional Materials</i>)
C	Waterproof, highly tough, and fast self-healing polyurethane for durable electronic skin (<i>Acs Appl Mater Interfaces</i>)
D	Tough and water-insensitive self-healing elastomer for robust electronic skin (<i>Advanced Materials</i>)
E	Synergy between dynamic covalent boronic ester and boron–nitrogen coordination: strategy for self-healing polyurethane elastomers at room temperature with unprecedented mechanical properties (<i>Materials Horizons</i>)
F	Water-enabled room-temperature self-healing and recyclable polyurea materials with super-strong strength, toughness, and large stretchability (<i>Acs Appl Mater Interfaces</i>)
G	Thermodynamically stable whilst kinetically labile coordination bonds lead to strong and tough self-healing polymers (<i>Nature Communication</i>)
H	A highly efficient self-healing elastomer with unprecedented mechanical (<i>Advanced Materials</i>)
I	A self-reinforcing and self-healing elastomer with high strength, unprecedented toughness and room-temperature reparability (<i>Materials Horizons</i>)
J	A highly stretchable, transparent, notch-insensitive self-healing elastomer for coating (<i>Journal of Materials Chemistry C</i>)

Fig. S9 The detail of literature corresponding to the number in Fig.6c.

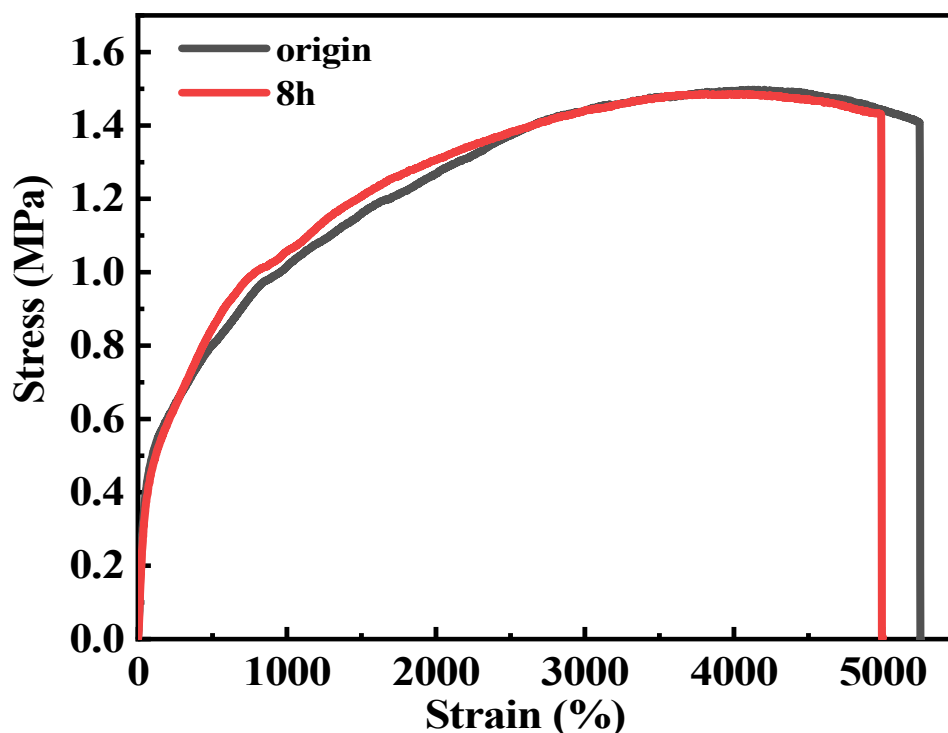


Fig. S10 Stress-strain curve of PPG-HD-PA which self-healed at room temperature for 8 h.

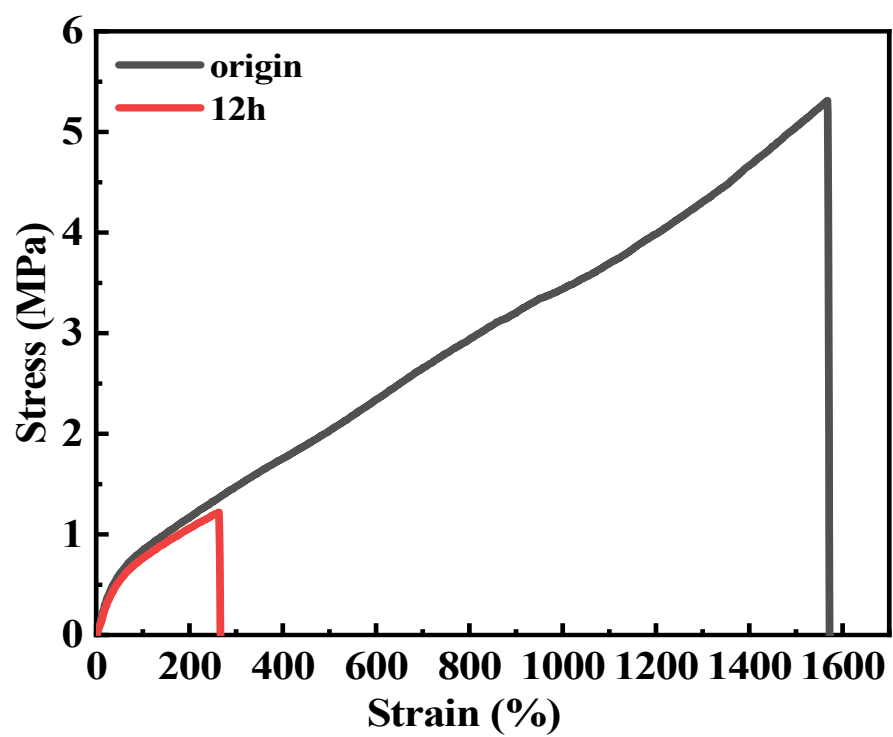


Fig. S11 Stress-strain curve of PPG-MD-PA which self-healed at room temperature for 12 h.