Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information for

Dynamic reversible adhesives based on crosslinking network via Schiff base and Michael addition

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1. Characterization Methods

Differential scanning calorimetry. DSC of the polymers was obtained using a Perkin-Elmer DSC 7 modified to measure heat flow of photoinitiated polymerizations. Samples were weighed into an aluminum DSC pan and placed into the sample holder without a lid, where the samples were held isothermally at 20 °C under a 20 mL min^{-1} flow of nitrogen.

Thermogravimetric analysis. TGA was performed using a TA Instruments Q50 thermogravimetric analyzer with a ceramic pan. Samples were held isothermally at 30 °C for five minutes and heated at 10 °C min−1 from 30 to 800 °C.

Fourier Transform Infrared Spectrophotometry. The ATR-FTIR spectra were performed on a Thermo Scientific Nicolet iS50 Fourier transform infrared spectrophotometer equipped with diamond crystal/built-in all-reflective diamond ATR. The spectra were recorded over a frequency range of 4000−400 cm^{-1} directly on polymers.

X-ray photoelectron spectroscopy. XPS measurements were carried out by using a Thermo ESCALAB 250 spectrometer with a twin anode Al Kα (1486.6 eV) X-ray source.

Nuclear Magnetic Resonance. ^{1}H NMR and ^{13}C NMR measurements were performed on a Varian-Inova (600 MHz) spectrometer at room temperature. Chemical shifts are reported in parts per million (δ) relative to TMS as the internal reference. The polymer samples were dissolved in $CDCl_3$ at a concentration of 5 mg mL^{-1}.

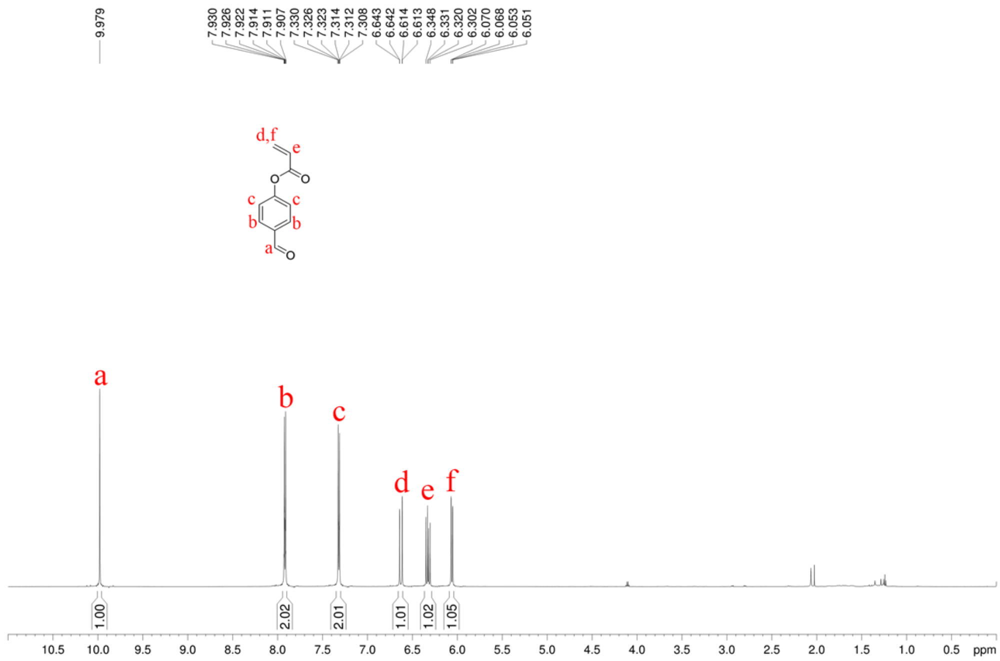

Figure S1. ^{1}H NMR spectrum (600 MHz, $CDCl_3$, rt) of **FPA**

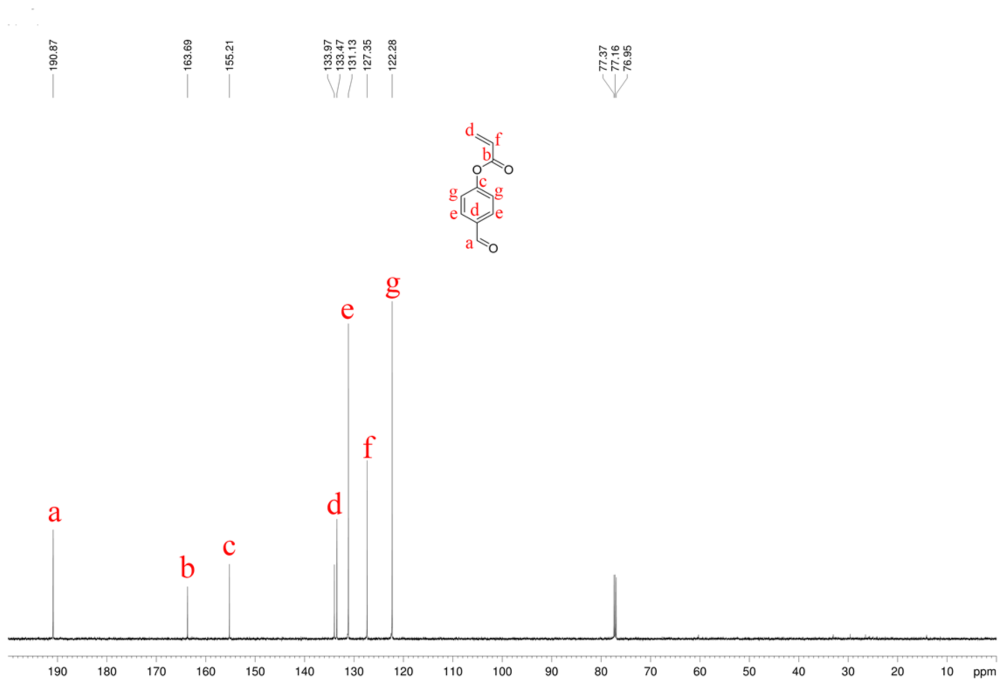

Figure S2. ^{13}C NMR spectrum (150 MHz, $CDCl_3$, rt) of **FPA**

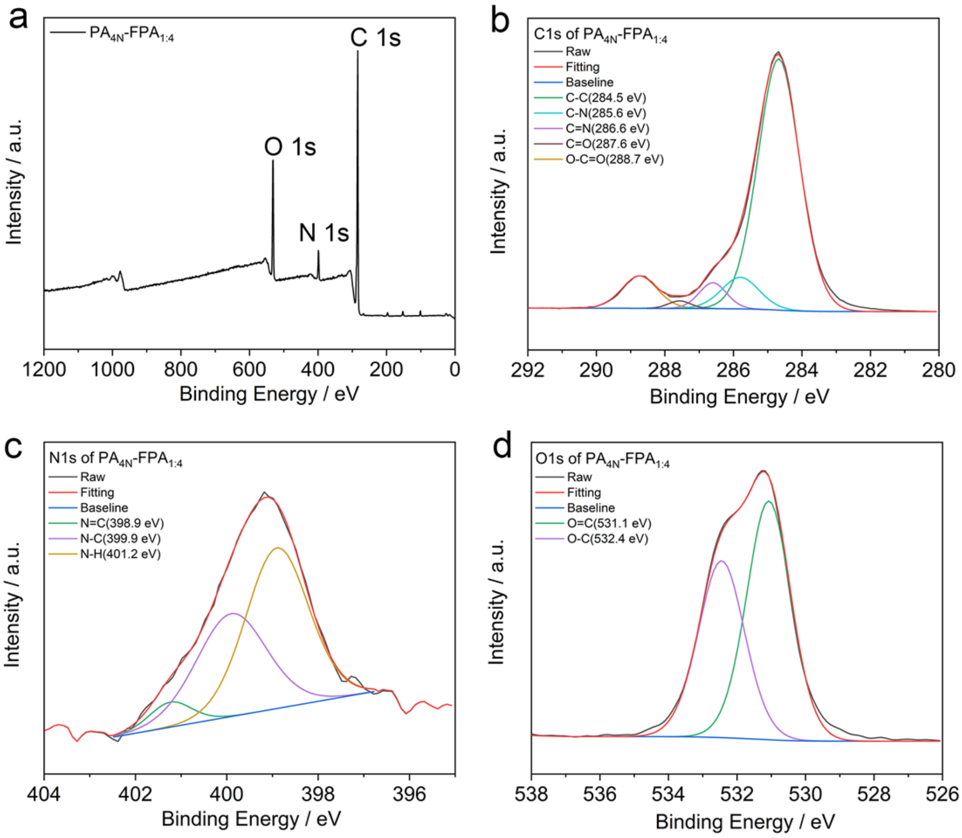

Figure S3. (a) XPS measurement spectra of PA_{4N}-$FPA_{1:4}$. (b) C1s high-resolution spectrum of PA_{4N}-$FPA_{1:4}$. (c) N1s high-resolution spectrum of PA_{4N}-$FPA_{1:4}$. (d) O1s high-resolution spectrum of PA_{4N}-$FPA_{1:4}$.

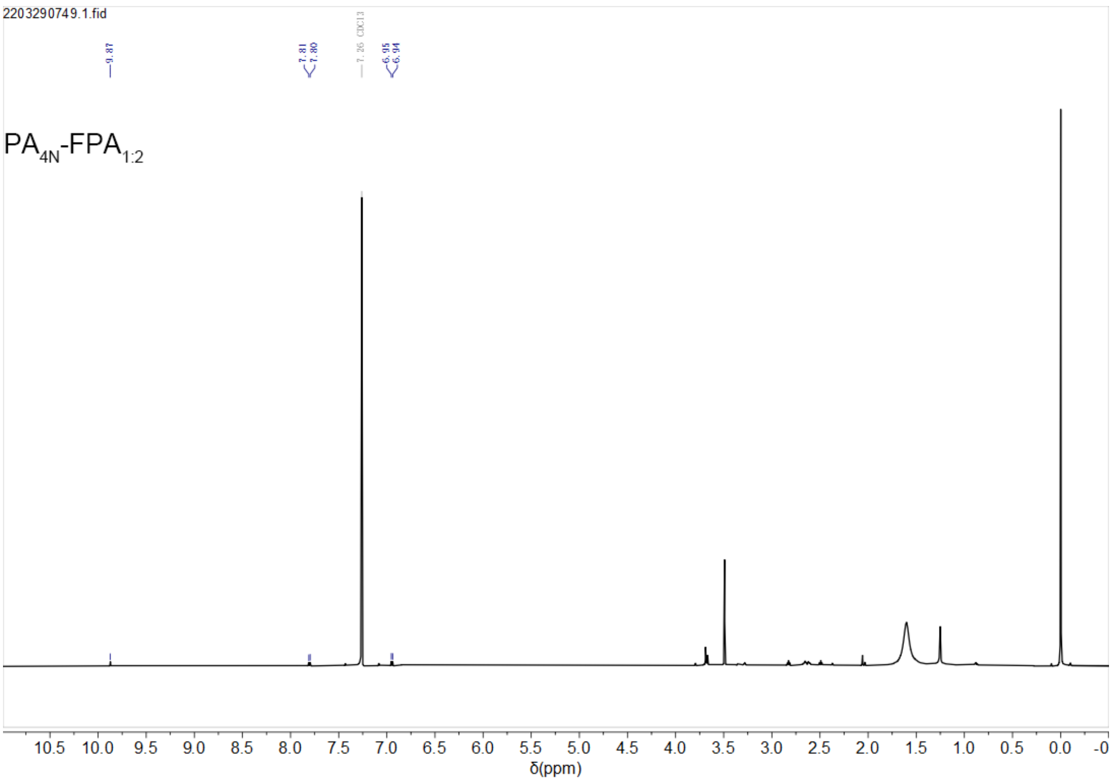

Figure S4. ^{1}H NMR spectrum (600 MHz, $CDCl_3$, rt) of PA_{4N}-$FPA_{1:2}$

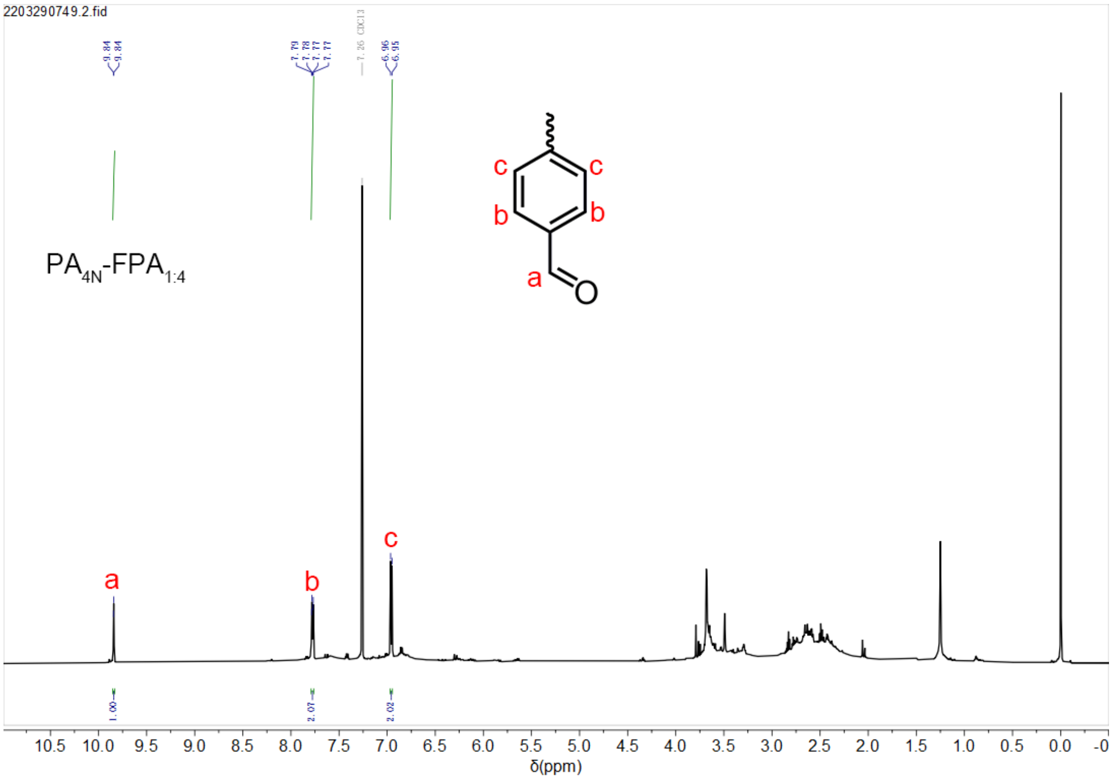

Figure S5. ^{1}H NMR spectrum (600 MHz, $CDCl_3$, rt) of PA_{4N}-$FPA_{1:4}$

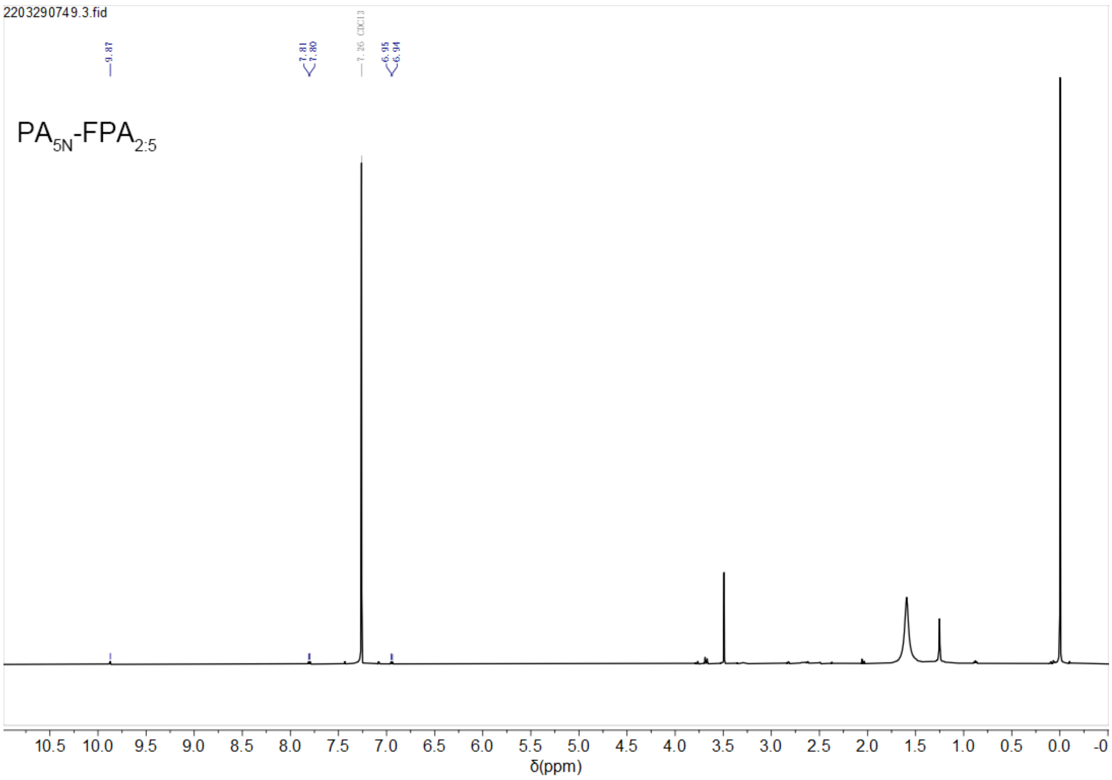

Figure S6. 1H NMR spectrum (600 MHz, CDCl3, rt) of PA_{5N}-$FPA_{2:5}$

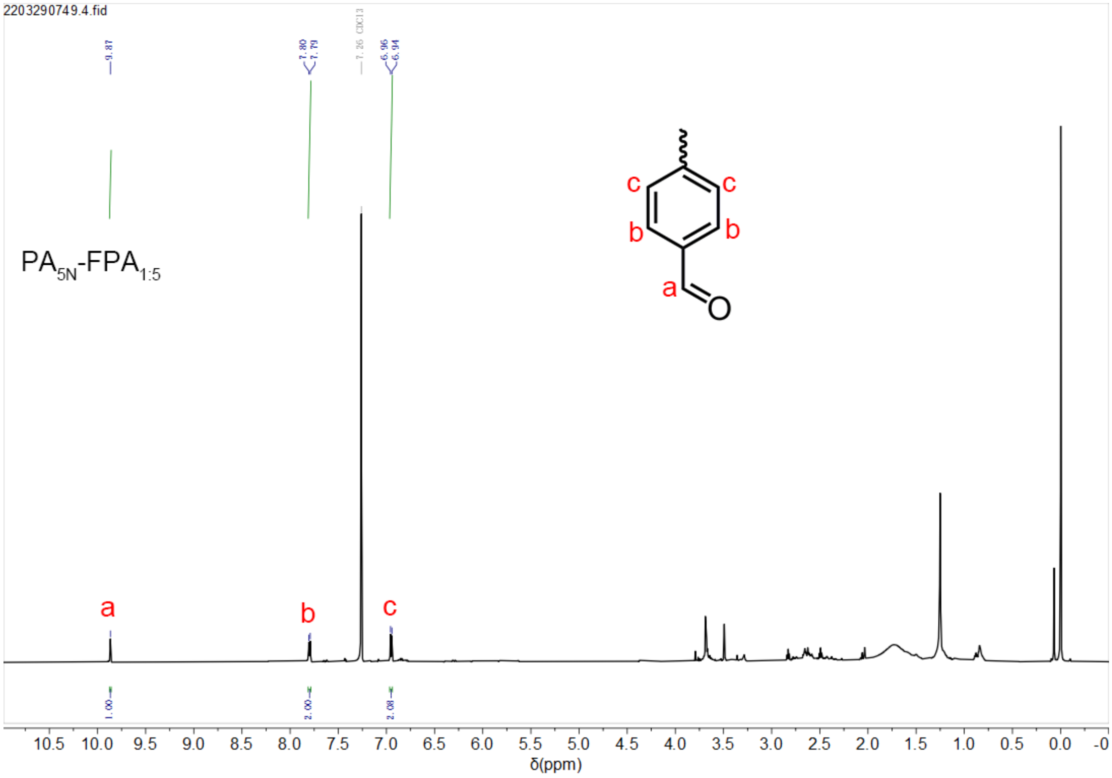

Figure S7. [1]H NMR spectrum (600 MHz, $CDCl_3$, rt) of PA_{5N}-$FPA_{1:5}$

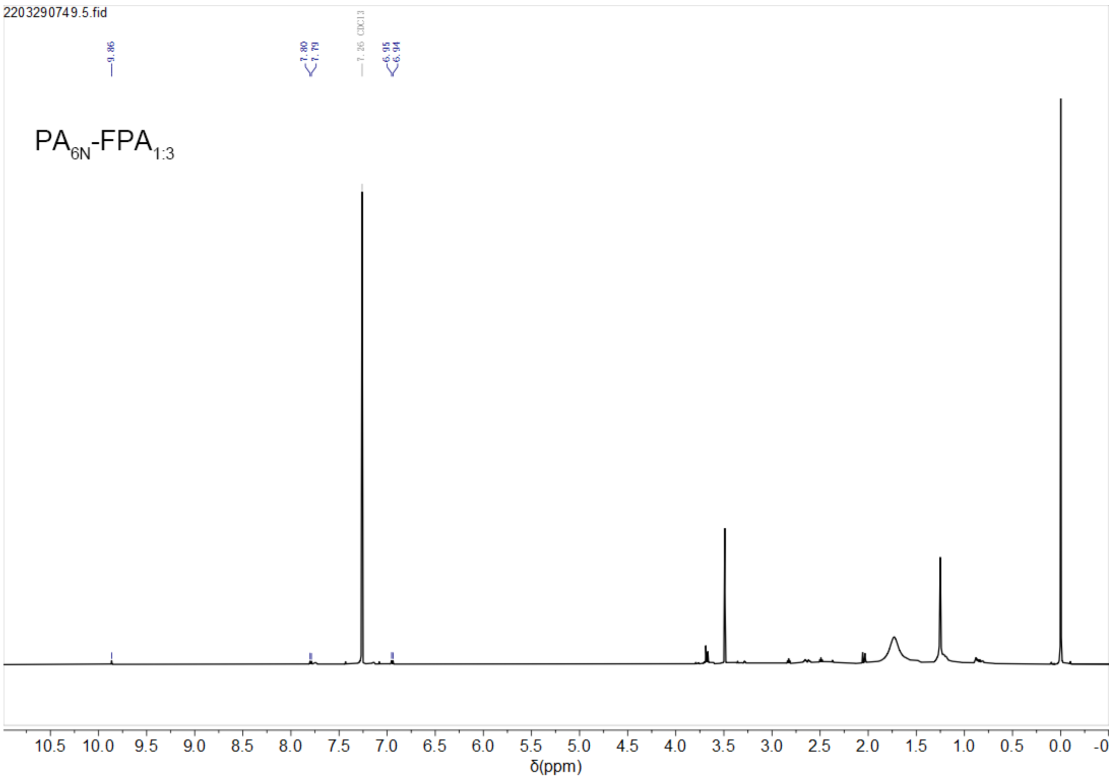

Figure S8. [1]H NMR spectrum (600 MHz, $CDCl_3$, rt) of PA_{6N}-$FPA_{1:3}$

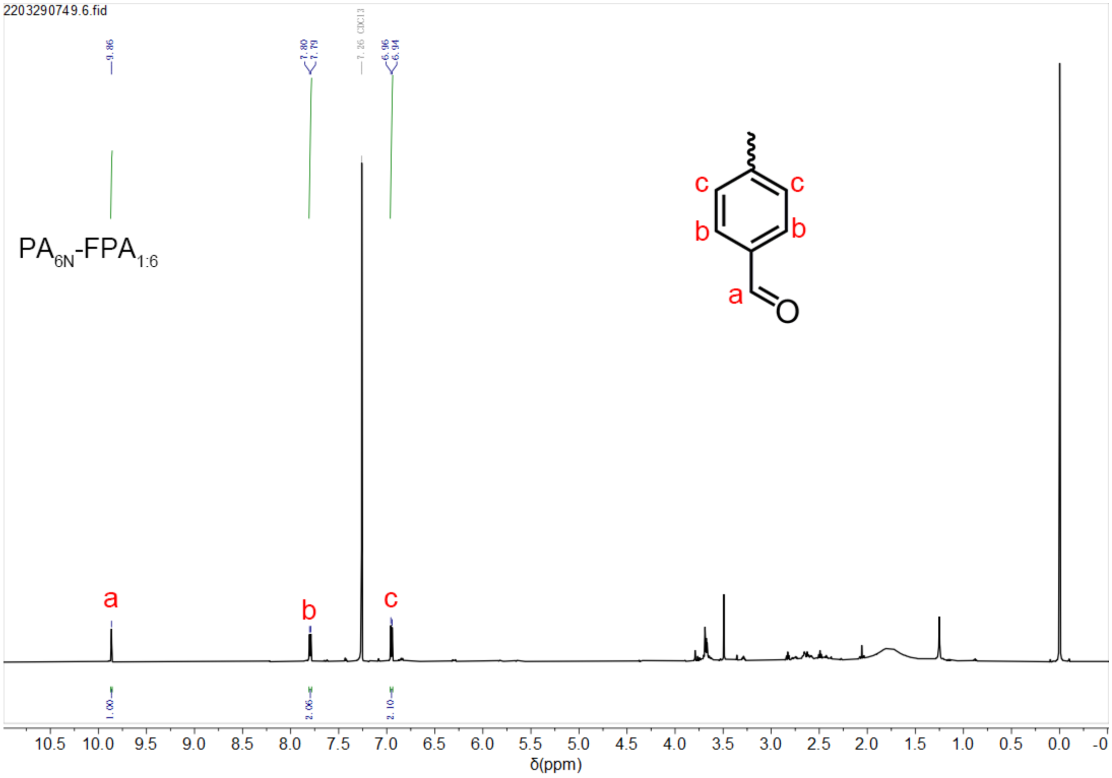

Figure S9. ^{1}H NMR spectrum (600 MHz, $CDCl_3$, rt) of PA_{6N}-$FPA_{1:6}$

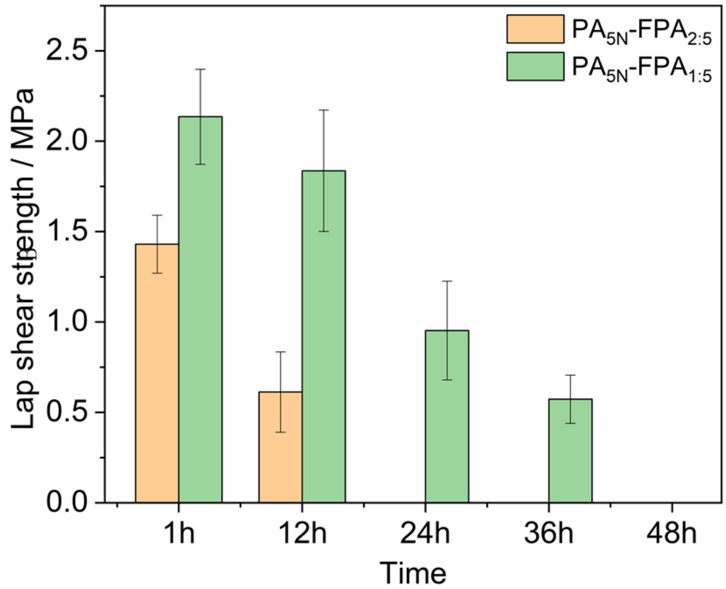

Figure S10. The adhesion strength of FPA-PA adhesives soaked in water.

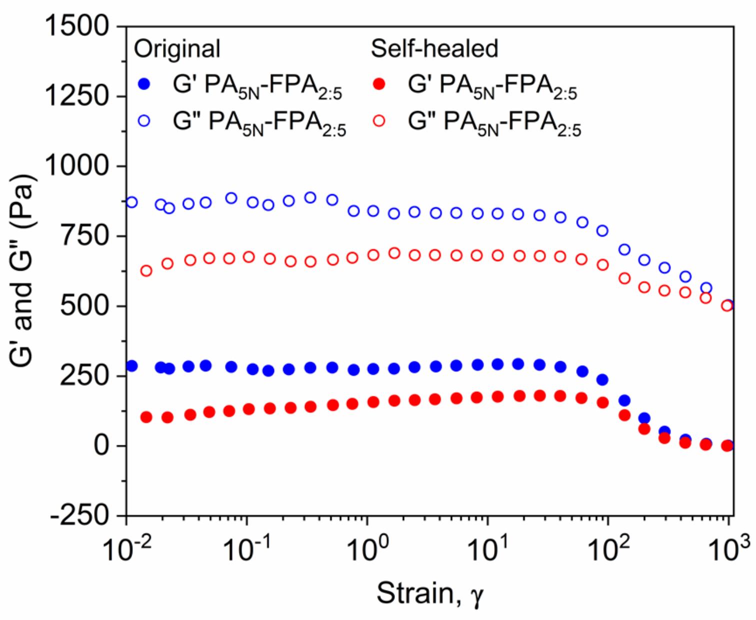

Figure S11. [1]H NMR spectrum

Table S1. The adhesion strength (MPa) of FPA-PA adhesives on different substrates

Adhesives	Steel	Al	Glass	PVC	PTFE
PA_{4N}-$FPA_{1:2}$	1.6 (0.13)	1.2 (0.23)	0.7 (0.05)	0.9 (0.05)	0.3 (0.01)
PA_{4N}-$FPA_{1:4}$	2.4 (0.21)	1.0 (0.16)	1.1 (0.08)	1.2 (0.03)	0.3 (0.03)
PA_{5N}-$FPA_{2:5}$	1.8 (0.09)	1.3 (0.17)	1.0 (0.07)	1.2 (0.04)	0.3 (0.02)
PA_{5N}-$FPA_{1:5}$	2.2 (0.11)	1.2 (0.2)	1.4 (0.1)	1.3 (0.06)	0.3 (0.02)
PA_{6N}-$FPA_{1:3}$	2.0 (0.05)	1.7 (0.09)	1.1 (0.08)	1.3 (0.03)	0.4 (0.03)
PA_{6N}-$FPA_{1:6}$	2.3 (0.12)	1.3 (0.13)	1.4 (0.06)	1.1 (0.02)	0.3 (0.03)

*The data in parentheses represent the standard deviation.

Table S2. The contact angle of water and diiodomethane on different substrates.

Substrates	Contact angle / (°)	
	Water	Diiodomethane
Glass	34.2 (0.80)	40.4 (0.65)

PVC	48.4 (0.38)	47.7 (1.12)
Wood	64 (0.63)	10 (2.33)
Bamboo	22.6 (3.39)	37.3 (0.92)
Steel	55.3 (3.2)	43.6 (1.73)
Al	67.6 (1.31)	54.4 (1.16)

*The measurement results are the average of six samples, and the data in parentheses represent the standard deviation.

Table S3. The surface energy of different substrates.

Substrates	Dispersion force (J/m^2)	Polarity forces (J/m^2)	Surface energy (J/m^2)
Glass	26.3	35.6	61.9
PVC	24.6	27.5	52.1
Wood	43.3	9.2	52.5
Bamboo	26.5	41.4	67.9
Steel	28.1	20.6	48.7
Al	24.4	14.5	38.9