Supplementary information

Facile coating of low-molecular-weight stretchable adhesive films leveraging carbodiimide-to-urea conversion and gallic acid for enhanced adhesion

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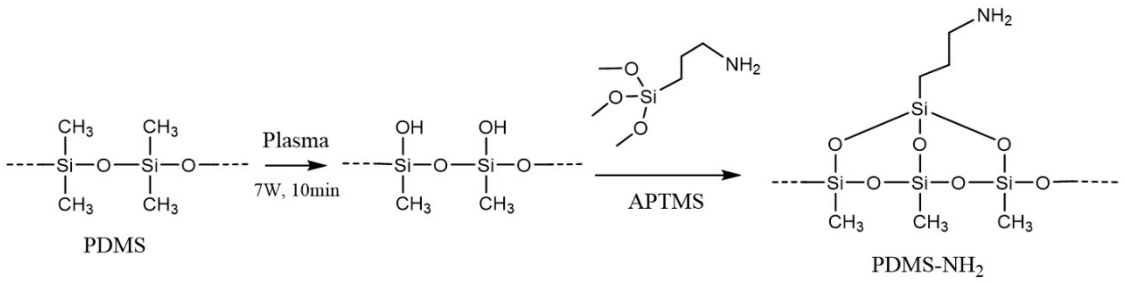

Figure S1. Silane-coupling reaction through hydroxyl groups of the plasma-treated PDMS using APTMS to introduce amino groups into the PDMS. (PDMS = polydimethylsiloxane; APTMS = 3-aminopropyltrimethoxysilane).

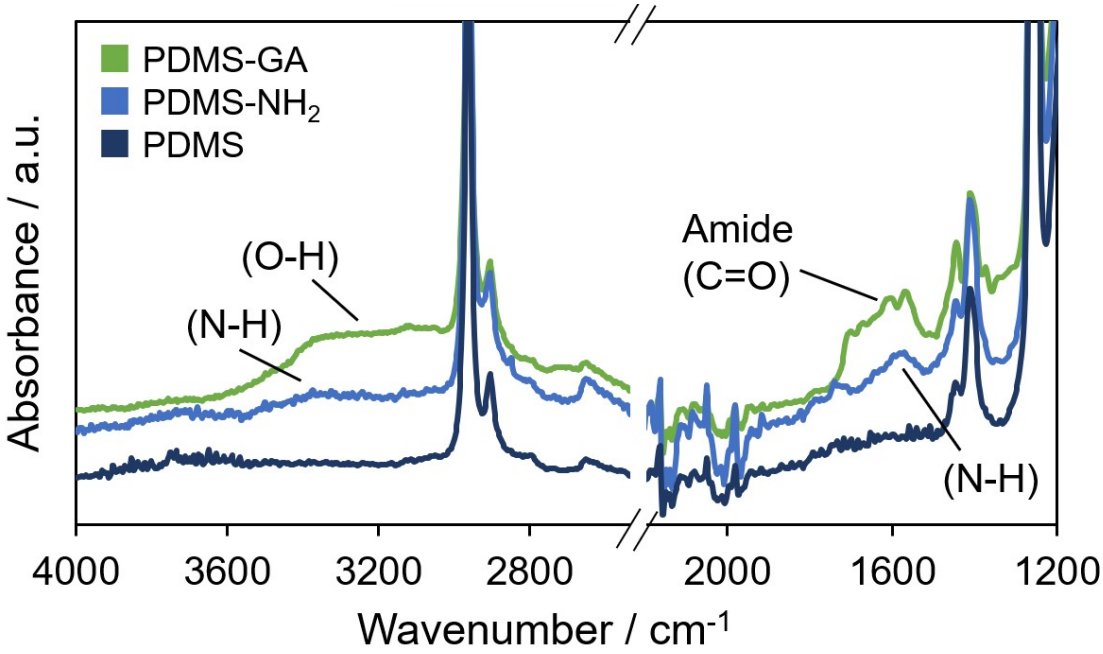

Figure S2. FT-IR spectra of pristine PDMS, aminated PDMS (PDMS-NH_2), and gallol-introduced PDMS (PDMS-GA). (FT-IR = Fourier-transform infrared; PDMS = polydimethylsiloxane).

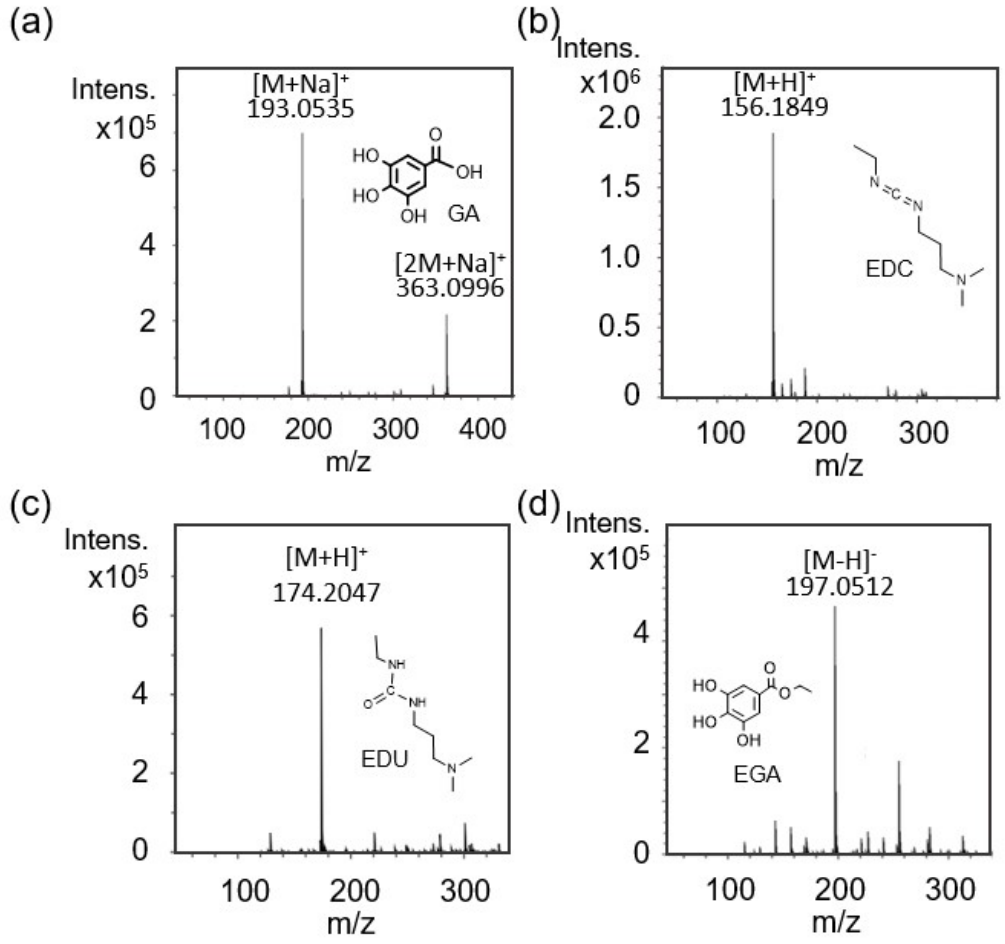

Figure S3. ESI-MS spectra of (a) GA, (b) EDC, and (c,d) the compounds in the adhesive layer dissolved in methanol. (a-c) show the results of positive mode and (d) shows that of negative mode ESI-MS measurements. (ESI-MS = electrospray ionization–mass spectrometry; GA= gallic acid; EDC = 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide; EGA= ethyl gallate; EDU = 1-ethyl-3-(3-dimethylaminopropyl)urea).

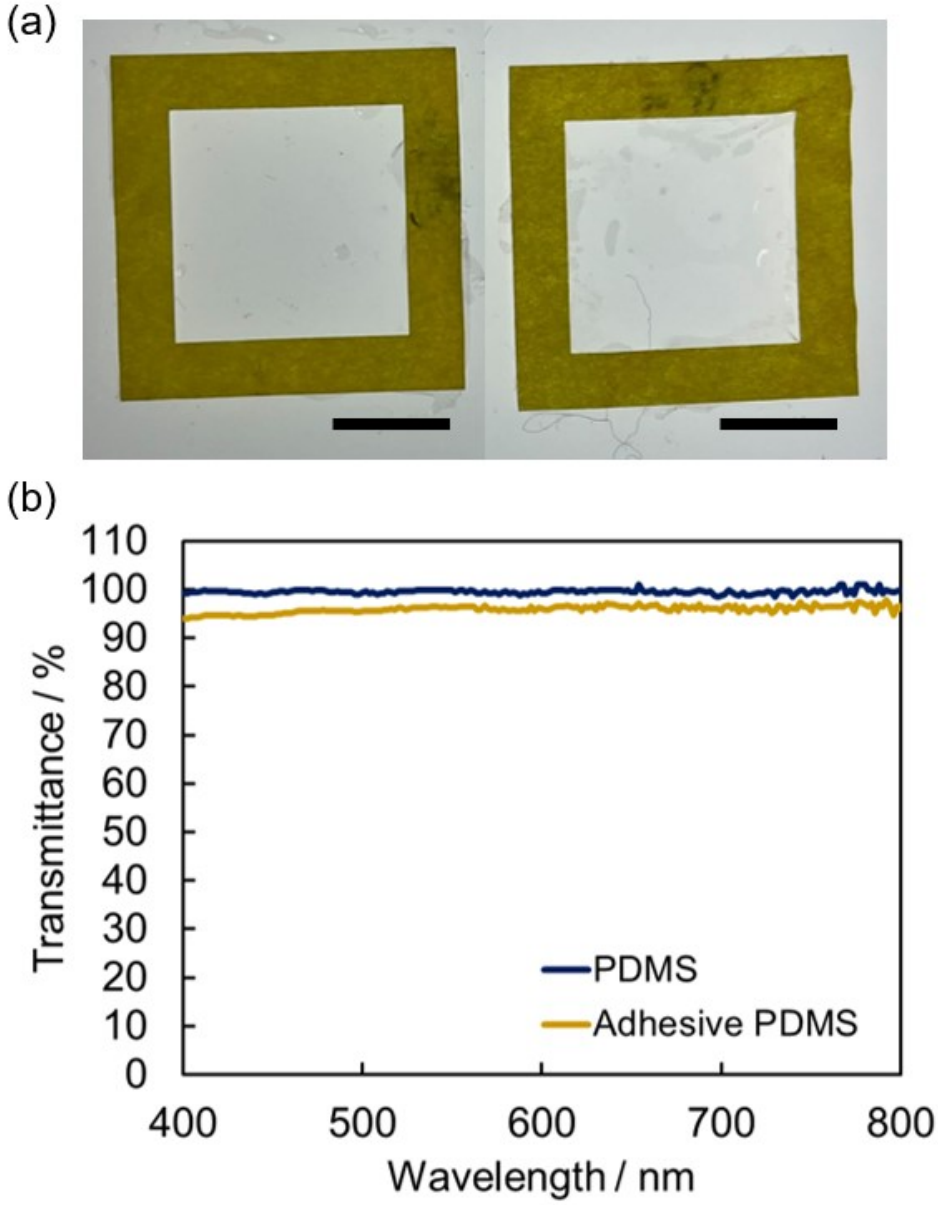

Figure S4. (a) Images of the pristine PDMS and adhesive PDMS films (scale bar = 1 cm), and (b) the results of ultraviolet-visible (UV-Vis) analysis of the films. (PDMS = polydimethylsiloxane).

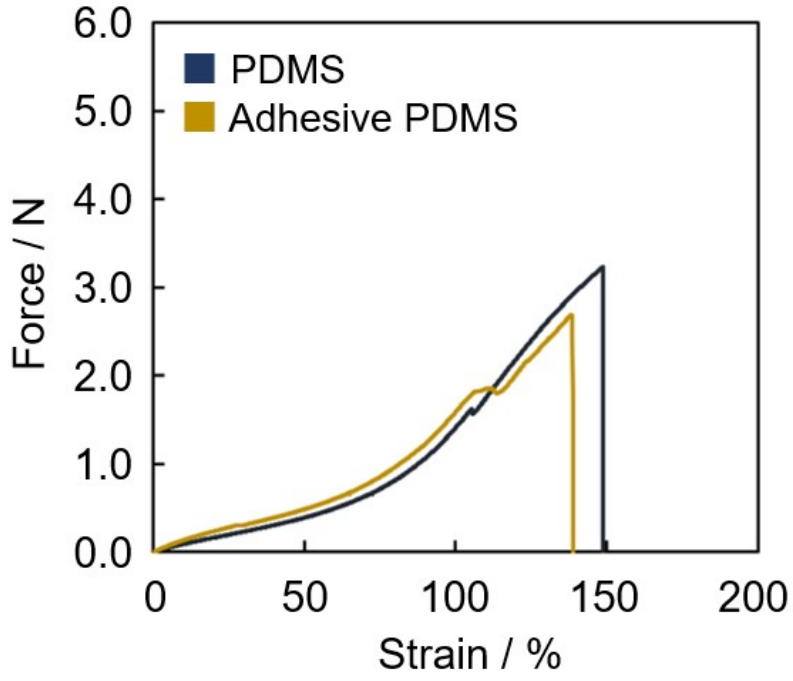

Figure S5. Tensile force during the tensile tests on PDMS and adhesive PDMS. (PDMS = polydimethylsiloxane).

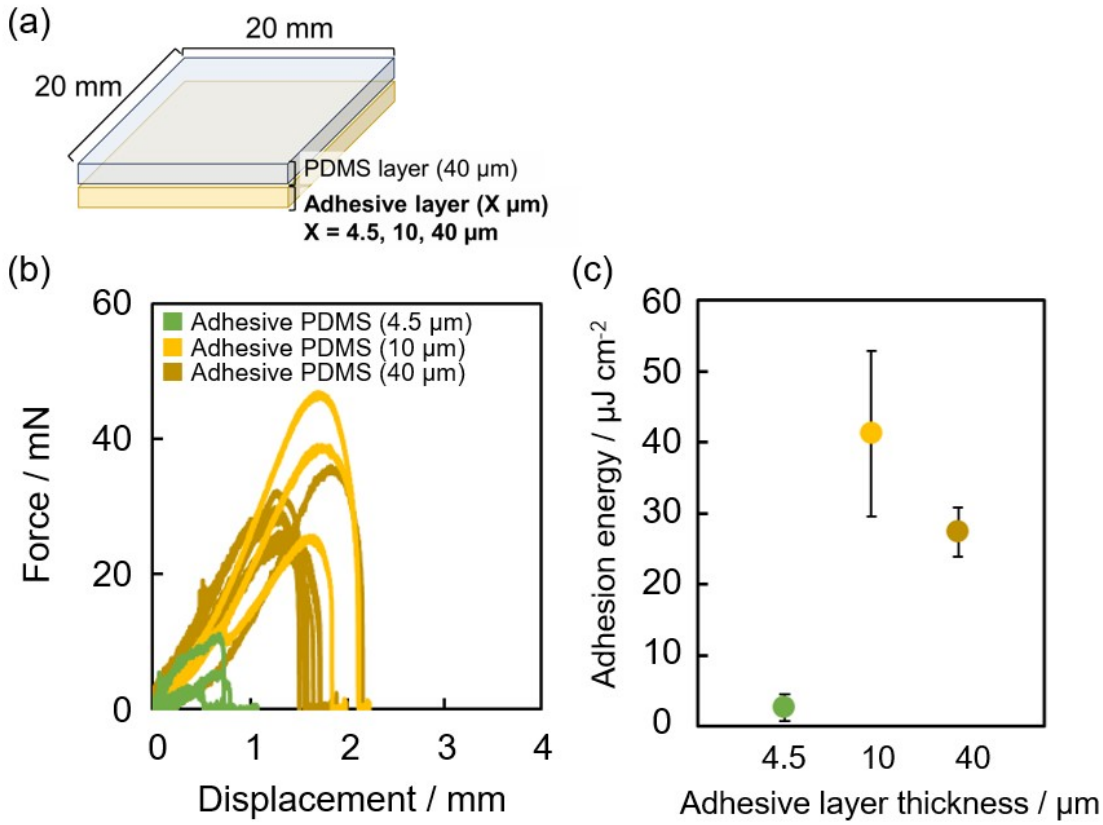

Figure S6. (a) The image of adhesive PDMS with the thickness of 4.5, 10, or 40 μm adhesive layer. (b) Results of the tack separation tests of adhesive PDMS with 4.5, 10, or 40 μm thick of adhesive layer and (c) calculated adhesion energy values. (PDMS = polydimethylsiloxane).

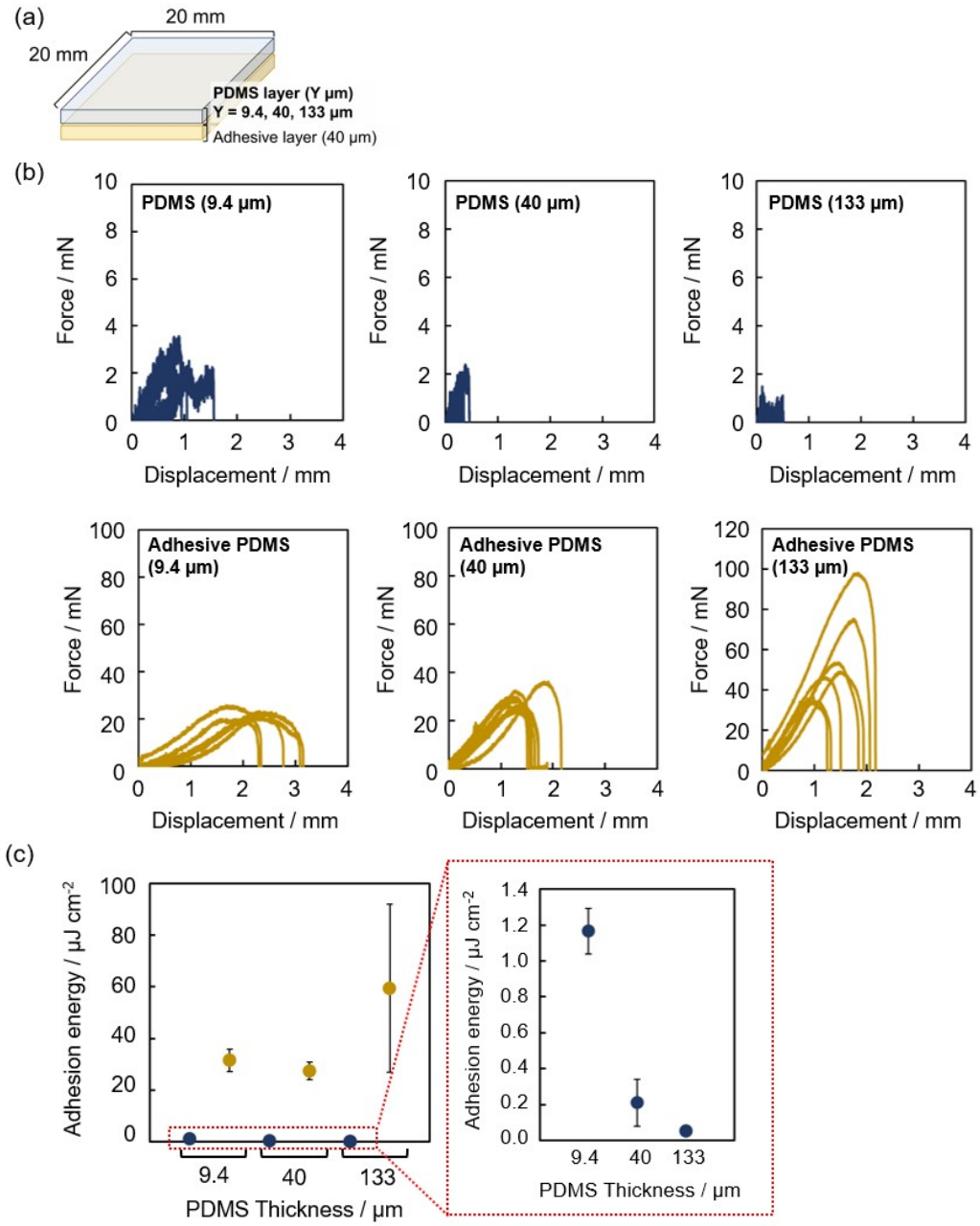

Figure S7. (a) The image of adhesive PDMS with the thickness of 9.4, 40, or 133 μm PDMS layer. (b) Results of the tack separation tests of pristine PDMS and adhesive PDMS with each thickness of PDMS layer and (c) calculated adhesion energy values. (PDMS = polydimethylsiloxane).

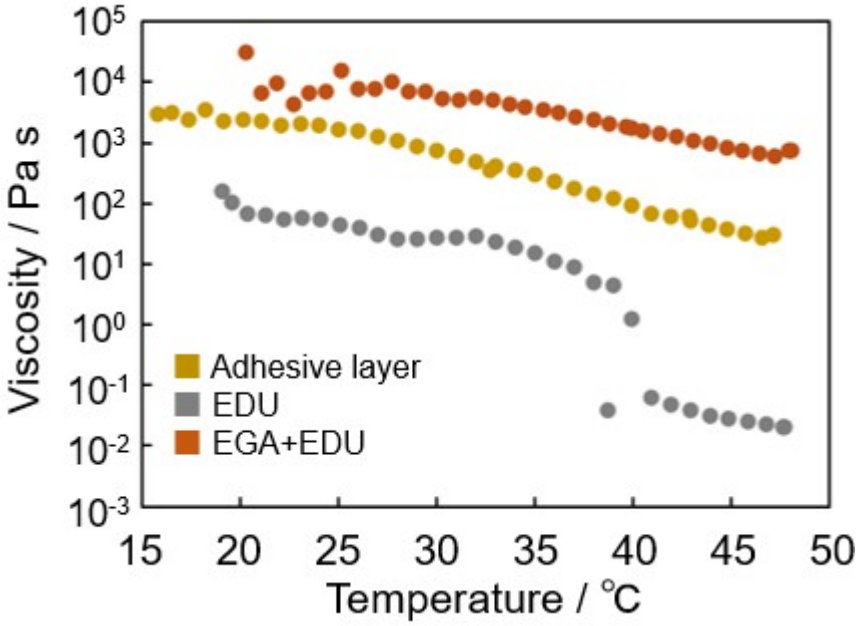

Figure S8. Temperature sweep measurements (viscosity vs. temperature) of the adhesive layer, EDU, and EGA+EDU. (EDU = 1-ethyl-3-(3-dimethylaminopropyl)urea; EGA = ethyl gallate).