Electronic Supplementary Material (ESI) for Nanoscale.

Supporting Information

A highly flexible and multifunctional strain sensor based on network-structured MXene/polyurethane mat with ultrahigh sensitivity and broad sensing range

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KEYWORDS: Mxene, strain sensor, network-structured, high sensitivity, broad sensing range

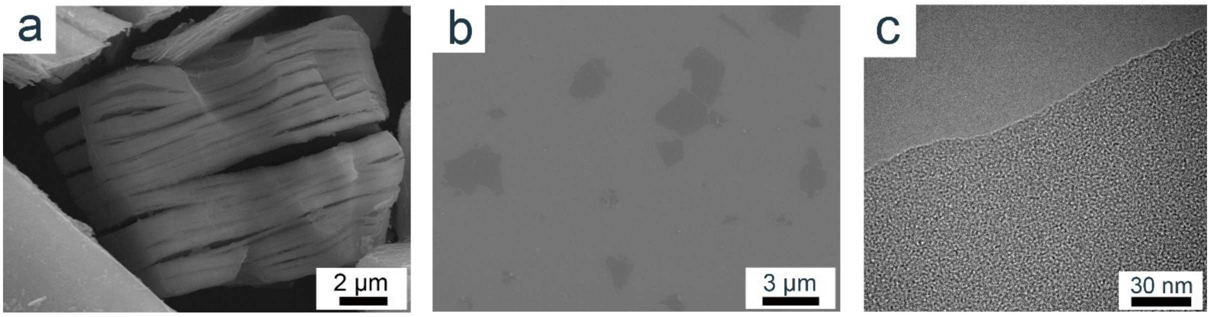

Figure S1. (a) SEM image of the $Ti_3C_2T_x$ after etching of Al. (b) SEM image of MXene flacks. (c) TEM image of several MXene flakes.

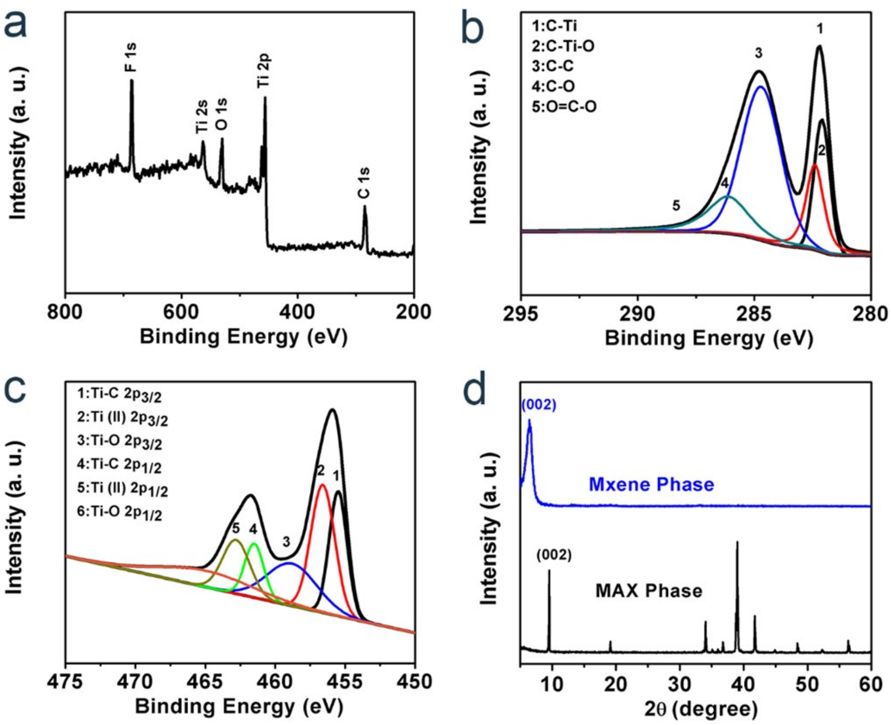

Figure S2. (a) XPS survey scan, (b) C1s spectrum and (c) Ti 2p spectrum of MXene. (d) XRD patterns of MAX and MXene phases.

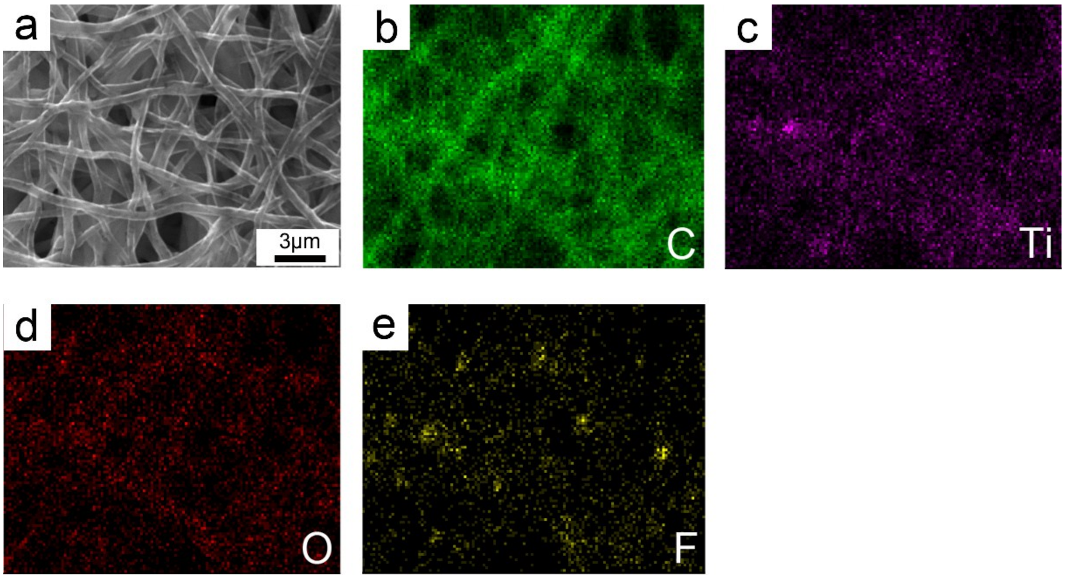

Figure S3. (a) SEM image and corresponding (b-d) EDX mapping of a typical network-M/P mat

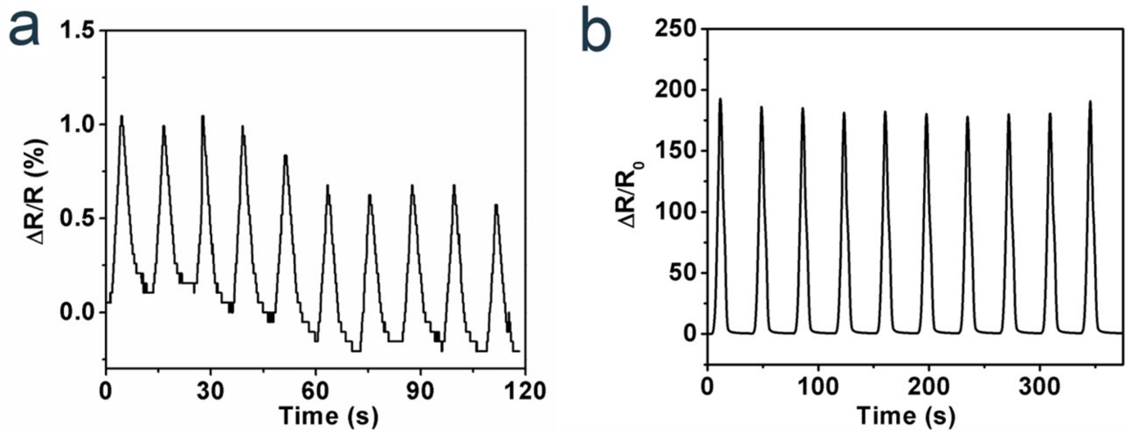

Figure S4. Dynamic responses of a typical network-M/P mat sensor for multiple cycles at (a) 0.1% strain and (b) 100% strain.

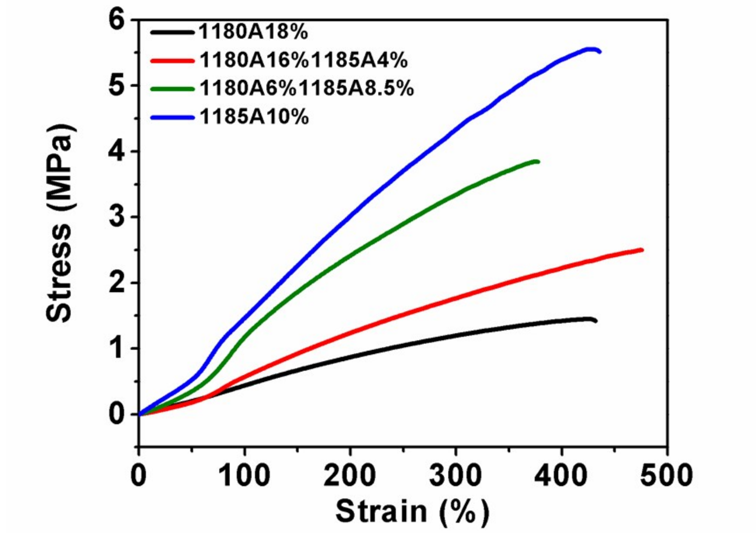

Figure S5. Stress-strain curves of network-M/P mat with different elastomer components.

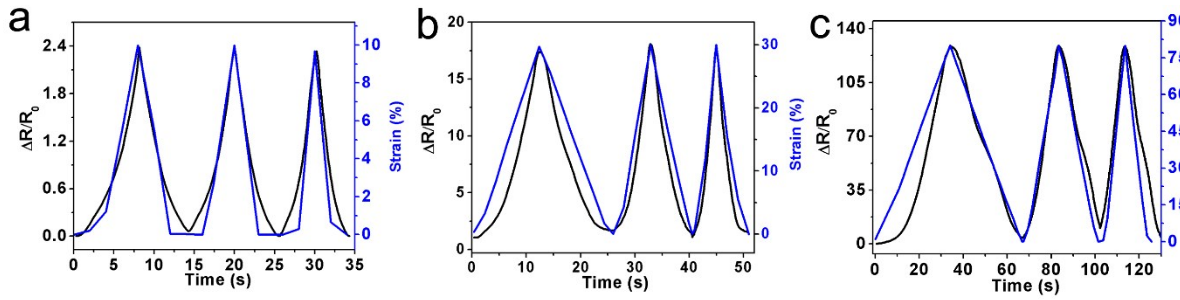

Figure S6. Plots showing sensing responses at different strain level (10% (a), 30% (b) and 80% (c)) and different tensile rates (the first cycle: 150% min^{-1}; the second cycle: 300% min^{-1}; the third cycle: 500% min^{-1}).

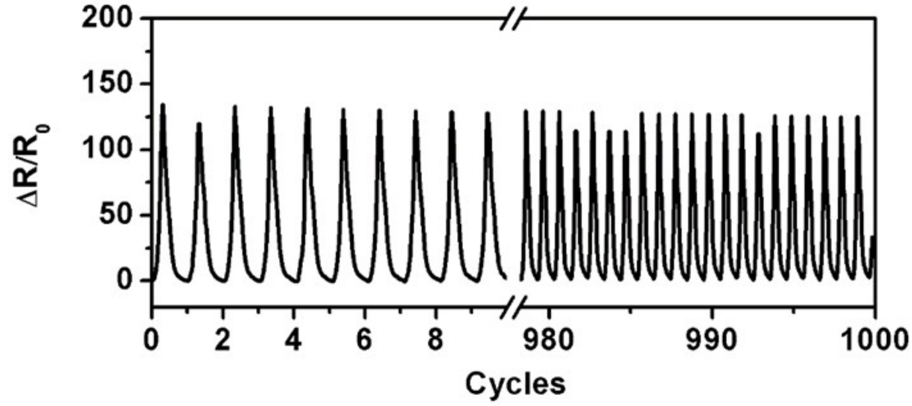

Figure S7. Long-term stability of a network-M/P mat sensor during 1000 cycles at 80% strain.

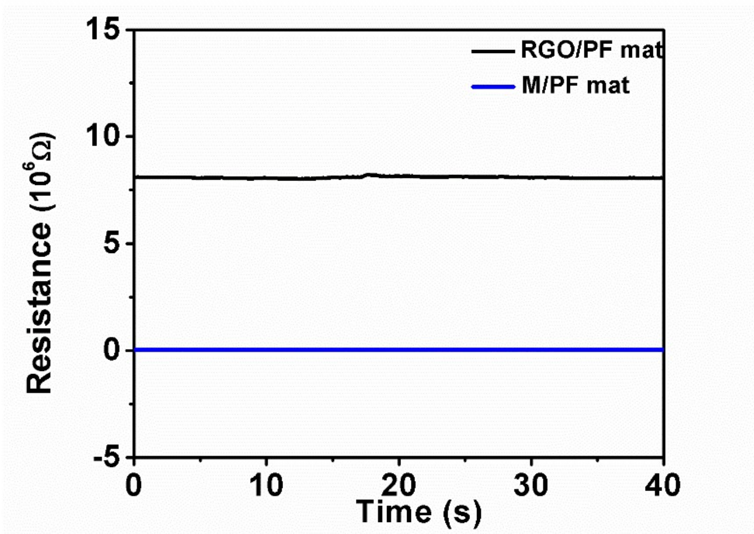

Figure S8. Comparison of the initial resistance of network-M/P mat and network-RGO/P mat.

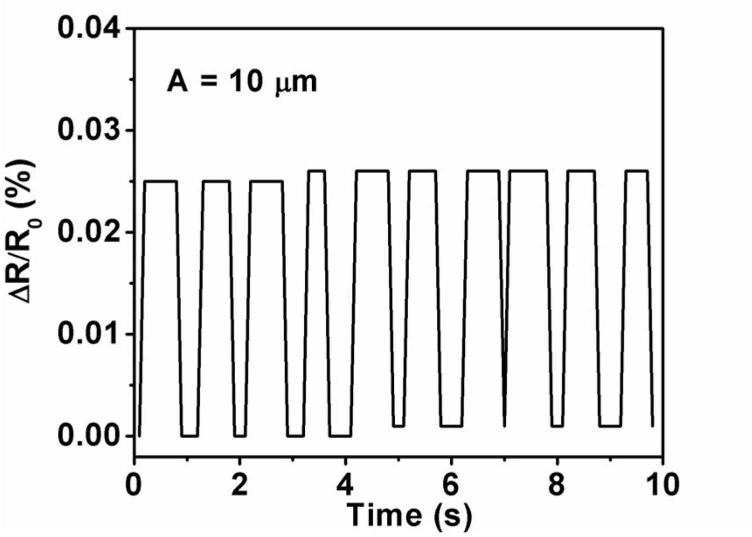

Figure S9. Relative resistance variation of a typical network-M/P mat sensor upon subtle vibration with an amplitude of 10 μm.