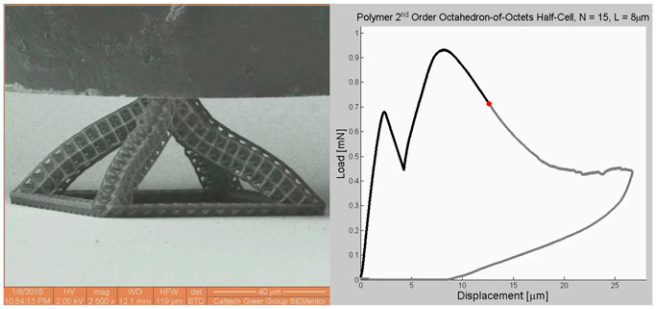
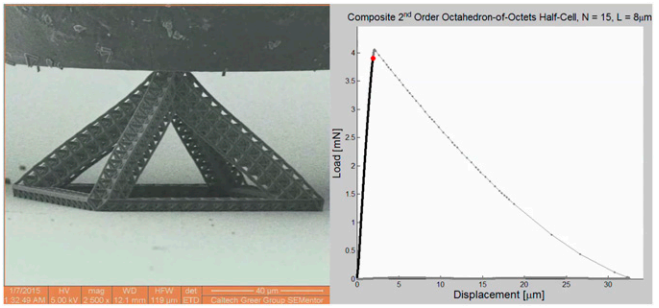
Supporting Information

Meza et al. 10.1073/pnas.1509120112



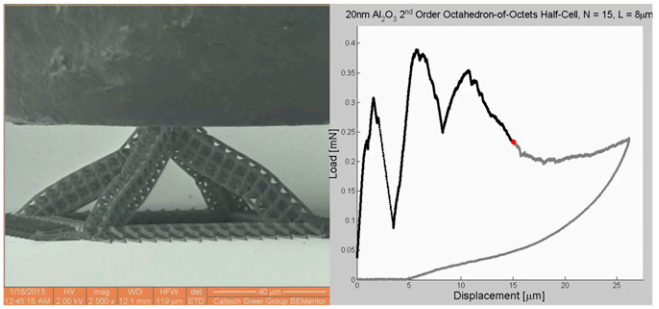
Movie S1. In situ compression experiment on an octahedron of octets second-order polymer half-cell with $L = 8$ μm and $N = 15$. The sample is displaced uniaxially to 50% strain at a rate of 10^{-3} s^{-1} and shows recovery to 85% of the original height after unloading. The sample is ductile throughout the compression experiment. ETD, Everhard–Thornley Detector; det, detector; HFW, horizontal field width; HV, high voltage; mag, magnification; WD, working distance.

Movie S1



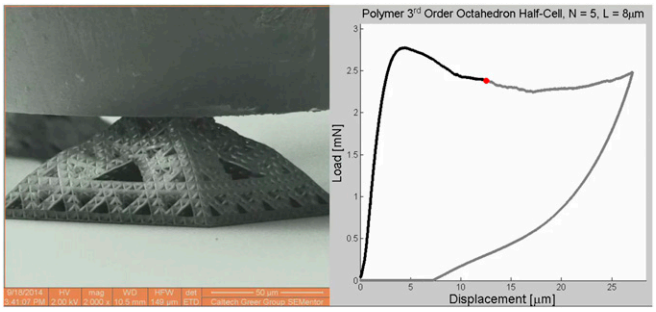
Movie S2. In situ compression experiment on an octahedron of octets second-order core-shell ceramic–polymer composite half-cell with $L = 8$ μm and $N = 15$. The sample is compressed at a strain rate of 10^{-3} s^{-1} until the onset of brittle failure, wherein the sample catastrophically fails and shows no recovery. ETD, Everhard–Thornley Detector; det, detector; HFW, horizontal field width; HV, high voltage; mag, magnification; WD, working distance.

Movie S2



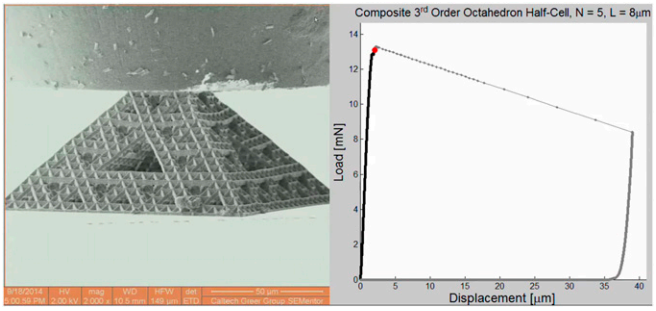
Movie S3. In situ compression experiment on an octahedron of octets second-order hollow Al_2O_3 half-cell with $L = 8$ μm and $N = 15$. The sample is displaced uniaxially to 50% strain at a rate of 10^{-3} s^{-1} and shows recovery to 90% of the original height after unloading. The sample displays ductile-like behavior throughout the compression experiment with a serrated load displacement curve. ETD, Everhard–Thornley Detector; det, detector; HFW, horizontal field width; HV, high voltage; mag, magnification; WD, working distance.

Movie S3



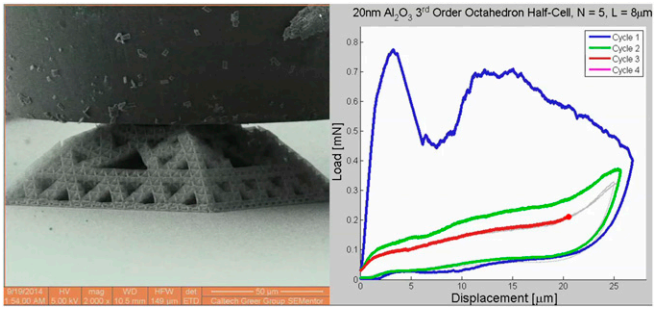
Movie S4. In situ compression experiment on an octahedron of octahedral of octahedra third-order polymer half-cell with $L = 8$ μm and $N = 5$. The sample is displaced uniaxially to 50% strain at a rate of 10^{-3} s^{-1} and shows recovery to 88% of the original height after unloading. The sample is ductile throughout the compression experiment. ETD, Everhard–Thornley Detector; det, detector; HFW, horizontal field width; HV, high voltage; mag, magnification; WD, working distance.

Movie S4



Movie S5. In situ compression experiment on an octahedron of octahedral of octahedra third-order core-shell ceramic–polymer composite half-cell with $L = 8$ μm and $N = 5$. The sample is compressed at a strain rate of 10^{-3} s^{-1} until the onset of brittle failure, wherein the sample catastrophically fails and shows no recovery. ETD, Everhard–Thornley Detector; det, detector; HFW, horizontal field width; HV, high voltage; mag, magnification; WD, working distance.

Movie S5



Movie S6. Cyclic in situ compression experiment on an octahedron of octahedral of octahedra third-order hollow Al_2O_3 half-cell with $L = 8$ μm and $N = 5$. The sample is displaced uniaxially to 50% strain at a rate of 10^{-3} s^{-1} and shows recovery to 96% of the original height after unloading during the first cycle, with nearly 100% recovery for each subsequent cycle. The sample displays ductile-like behavior throughout the compression experiment. ETD, Everhard–Thornley Detector; det, detector; HFW, horizontal field width; HV, high voltage; mag, magnification; WD, working distance.

Movie S6

Other Supporting Information Files

SI Appendix (PDF)