Supplementary Figures

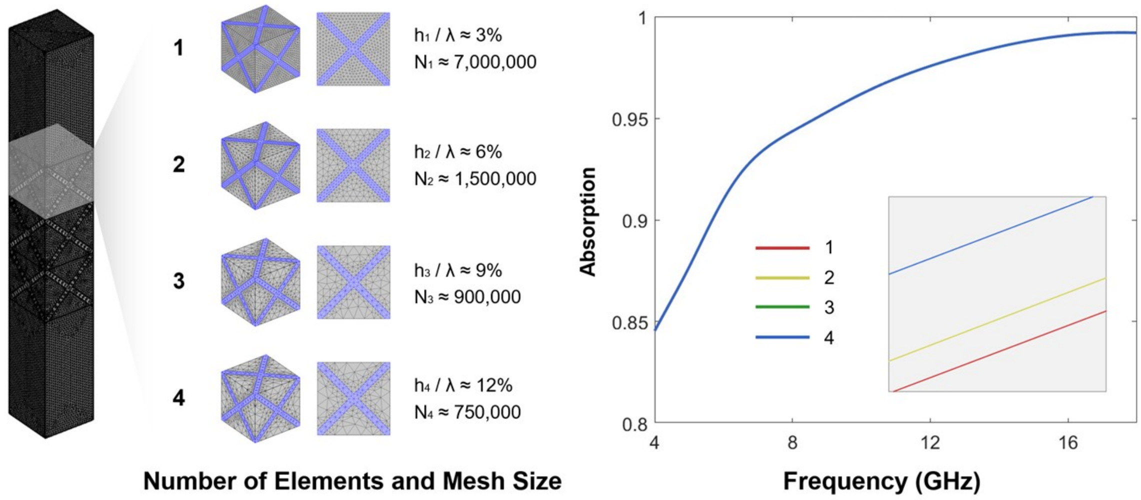

Figure S1. Mesh convergence test for the EM response for different mesh size configurations. Quadratic tetrahedral elements generate the computational mesh, with the maximum edge length of each element kept below 5% of the shortest incident wavelength (16.7 mm) to ensure numerical accuracy. Mesh resolution is tailored to each domain: the surrounding air region employs ≈ 164,000 elements with an edge length of ~ 0.1 mm, whereas the solid lattice region uses ≈ 27 000 elements refined to < 0.03 mm to resolve the struts. The resulting absorption spectrum deviates by less than 0.1% from the finest-mesh reference over 4–18 GHz, confirming numerical convergence.

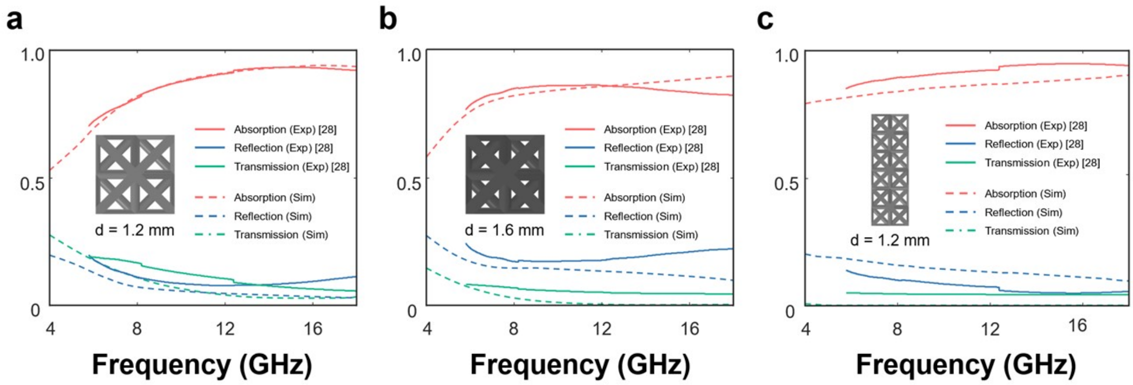

Figure S2. Comparison between simulated and experimental results[1] for the electromagnetic absorption of single-layer and multilayer OT lattices with a unit cell length of 10 mm. (a) Single-layer OT lattice with strut diameter d = 1.2 mm, (b) Single-layer OT lattice with d = 1.6 mm, and (c) Three-layer OT lattice with d = 1.2 mm.

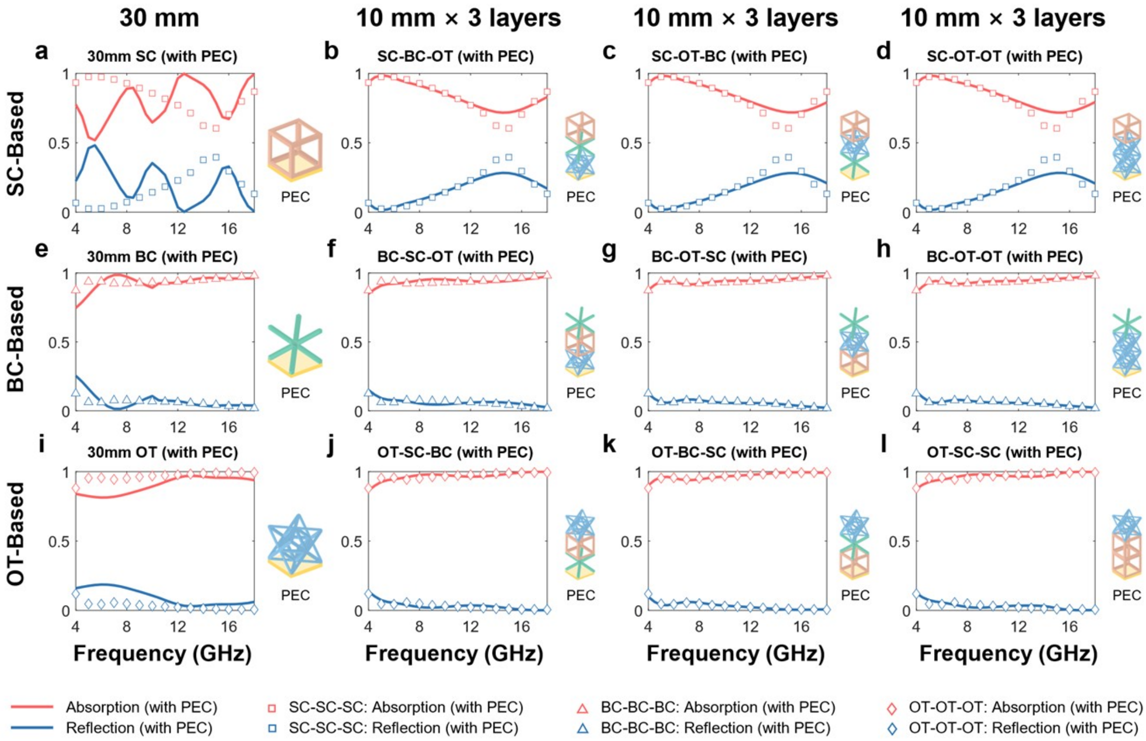

Figure S3. Electromagnetic response of single-layer and multilayer lattice structures with a PEC backing layer under normal incidence. (a–l) Absorption and reflection spectra over the 4–18 GHz frequency range for structures with a relative density of 0.1. Each row shows different stacking sequences of SC-based (a–d), BC-based (e–h), and OT-based (i–l) lattices. Because the PEC backing blocks all transmitted power, the transmission coefficient is identically zero.

References

1. D. D. Lim, J. Park, J. Lee, D. Noh, J. Lee, J. Choi and W. Choi, *Additive Manufacturing*, 2022, **55**, 102856.