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Supporting Information

Magnetically Actuated Reconfigurable Metamaterials as Conformal Electromagnetic Filters

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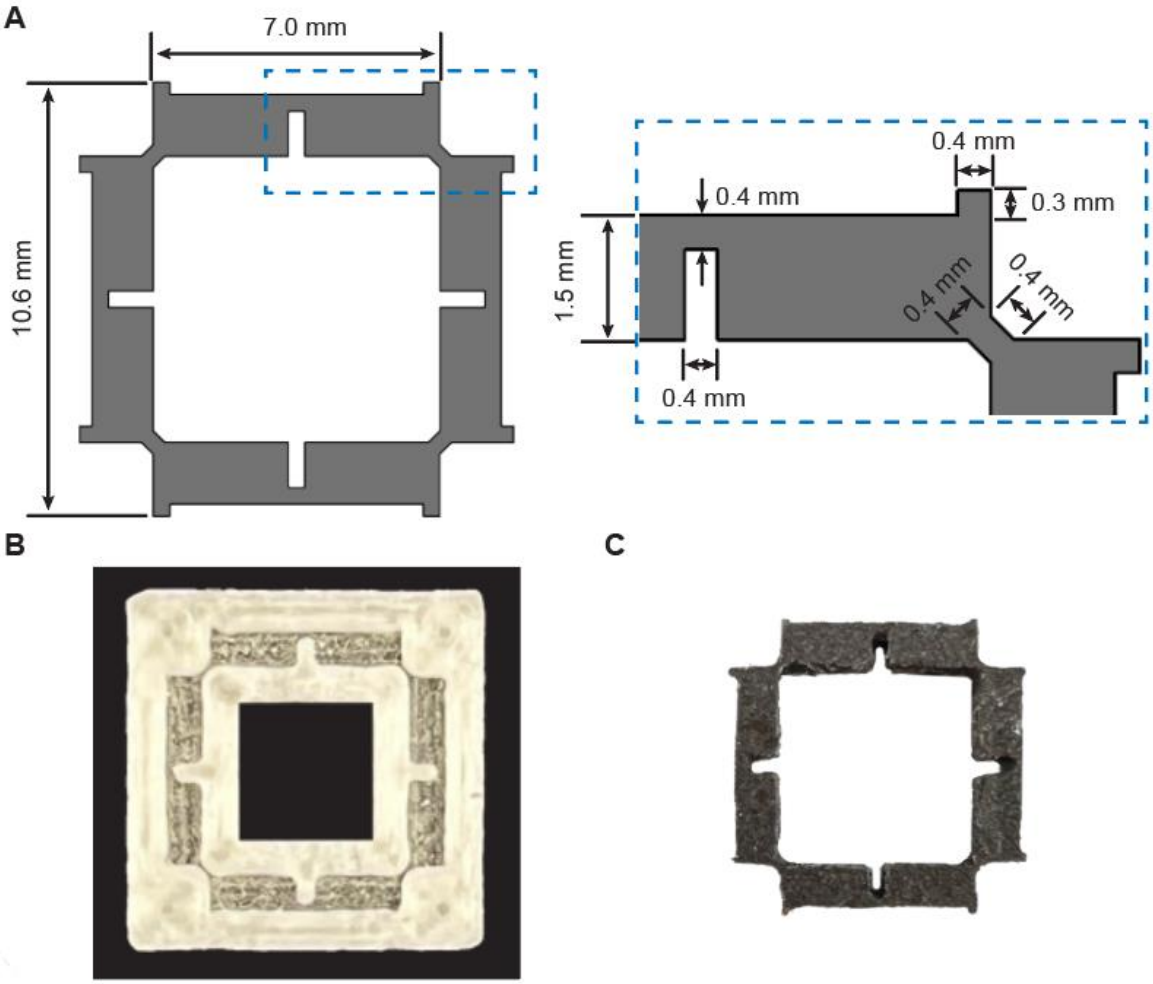

Figure S1. Dimensions and fabrication of the magnetic silicone-based unit. A) Detailed dimensions of the magnetic unit. B) 3D printed water-soluble polyvinyl alcohol reverse mold. C) Fabricated magnetic unit for metamaterial assembly.

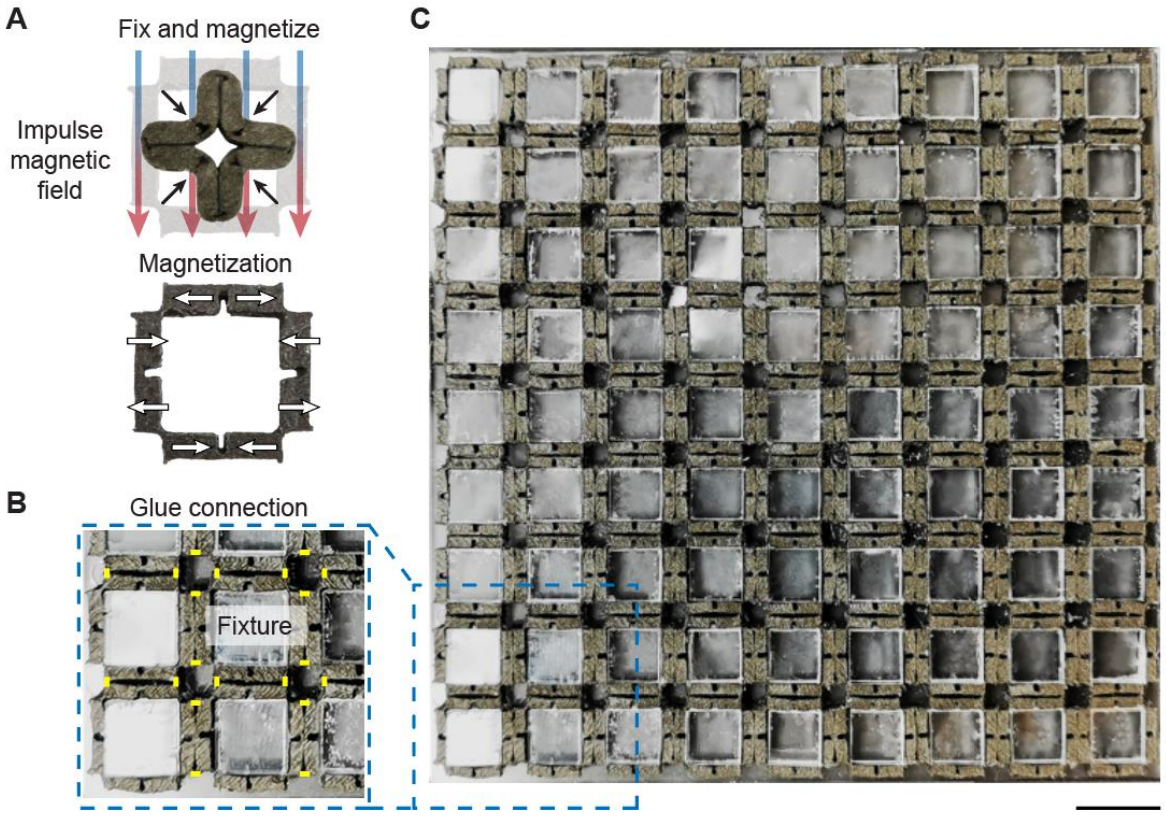

Figure S2. Fabrication of the magnetic silicone-based metamaterial. A) Folding and magnetizing of the magnetic unit. B) Glue connection between magnetic units. C) Assembled nine-by-nine metamaterial. Scale bar: 1 cm.

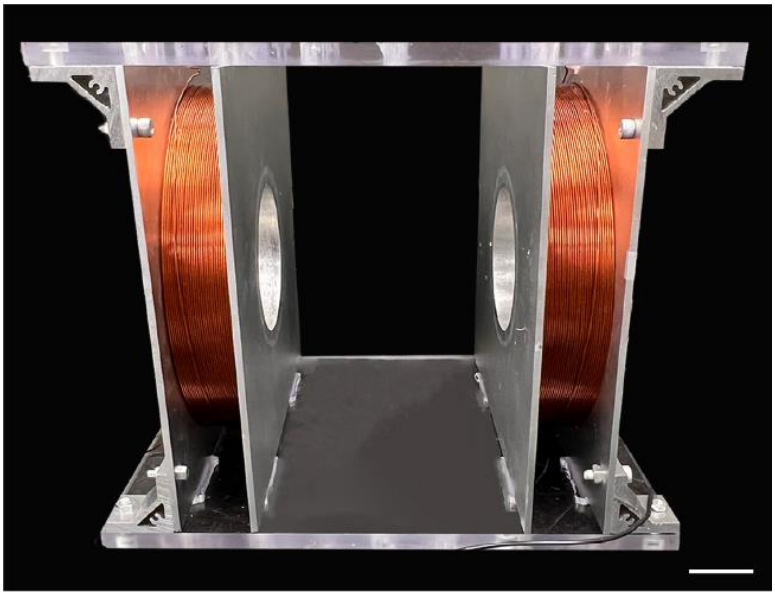

Figure S3. A pair of customized single-axis Helmholtz coils generating a homogeneous magnetic field for the magnetic actuation. Scale bar: 5 cm.

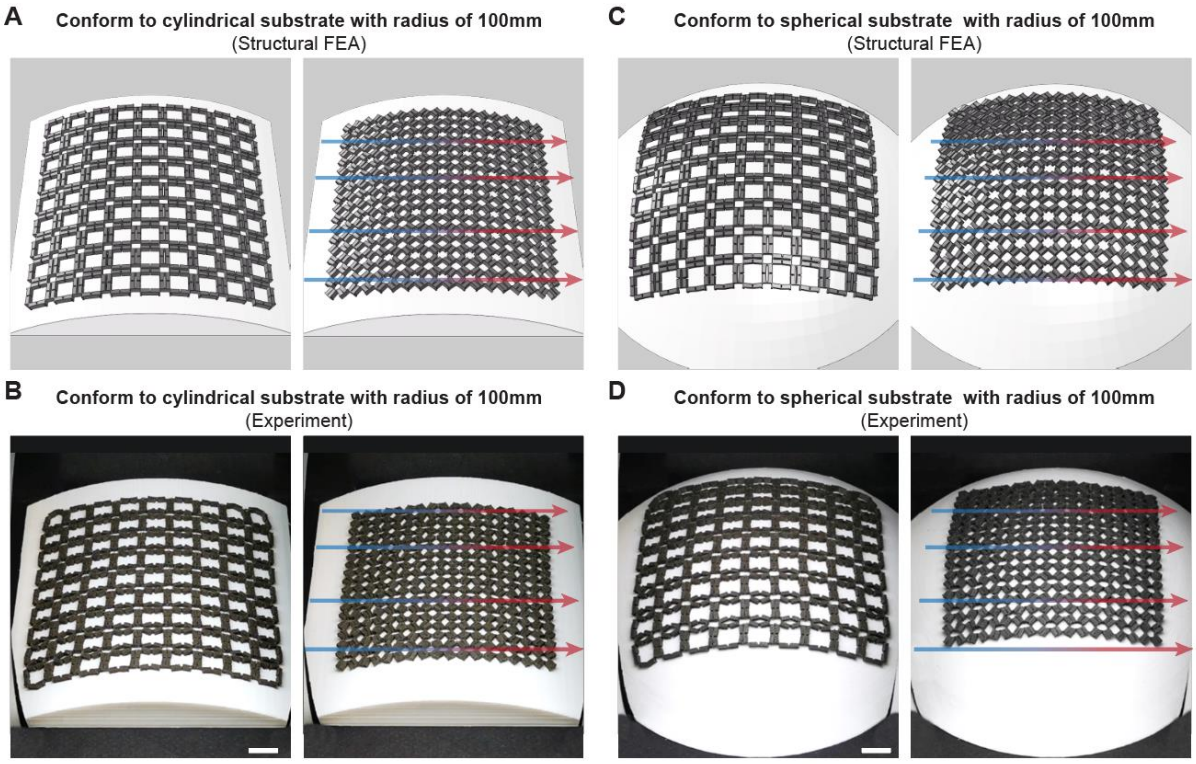

Figure S4. Magnetically actuated metamaterial conforms to different geometries. A) Structural FEA prediction and B) experimental validation of the metamaterial at both deployed state and folded state conforming to a cylindrical surface with a radius of 100 mm. C) Structural FEA prediction and D) experimental validation of the metamaterial at both deployed state and folded state conforming to a spherical surface with a radius of 100 mm. Scale bars: 1 cm.

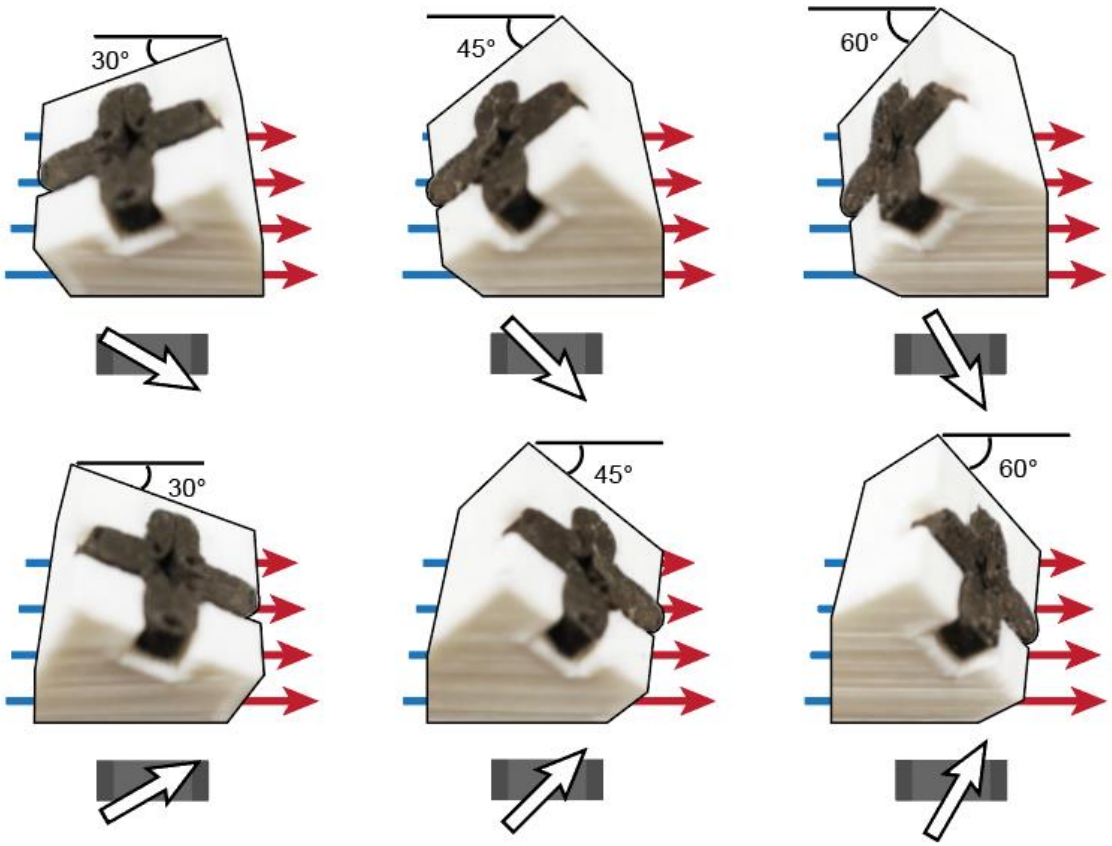

Figure S5. Magnetization process for fabricating magnetic units with predetermined in-plane and out-of-plane magnetization components.

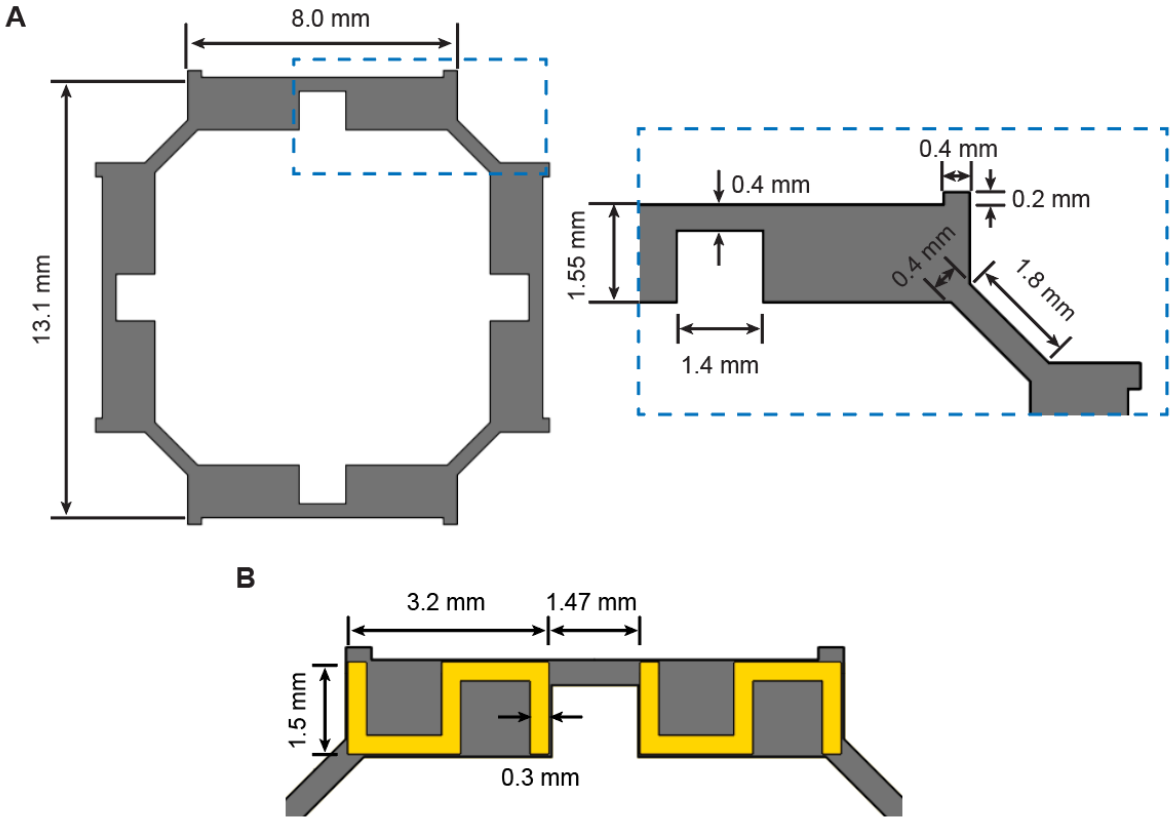

Figure S6. Dimensions of units and "S"-shaped conductive pattern of the magnetic shape memory-based EM metamaterial.

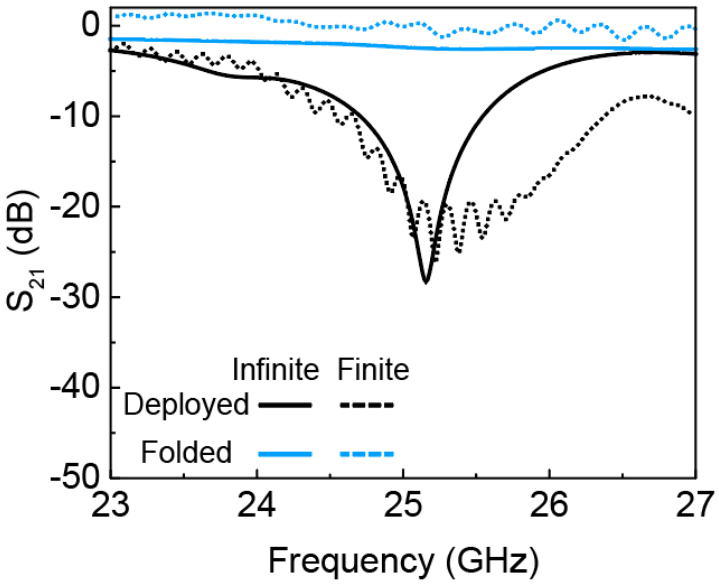

Figure S7. EM simulation predictions of infinite and finite (thirteen-by-thirteen) EM metamaterials' behaviors at both deployed and folded states, attached with an "S"-shaped conductive pattern. This indicates a thirteen-by-thirteen EM metamaterial is sufficiently large to represent an infinite metamaterial and is easy to fabricate.