

Supporting Information

## Geometry and Mesh Size Controls the EMI Shielding in 3D Printed Conducting Shape Memory PU Structures

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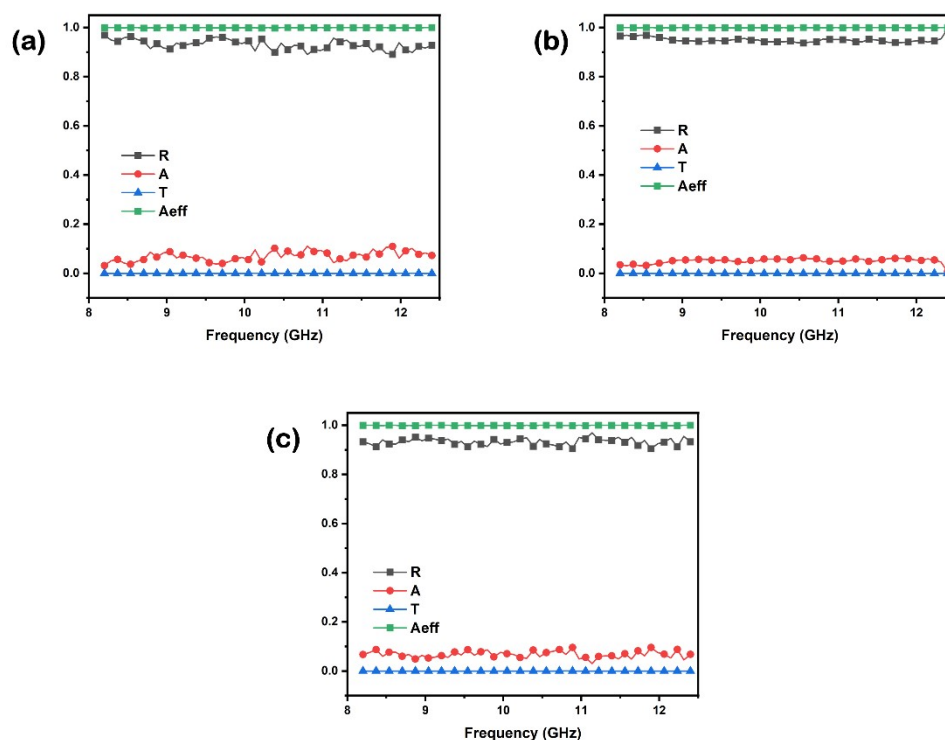
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### Mechanism of EMI shielding

The R, A and T plots of three best samples (one from each geometry) are shown in figure S1. It is observed that the values of R are higher than A. However, if we take a look at the formula used to calculate R and  $SE_R$ , we could see that they both are inversely related. (

$$R = |S_{11}|^2; SE_R = 10 \log \left( \frac{1}{1-R} \right)$$

Similar is the case for A and T. As the value of R is the highest (among R, A and T), we see that  $SE_R$  is the least.



**Figure S1: Reflection (R), Absorption (A), and Transmission (T) Coefficients of (a) 1 mm square, (b) 5 mm Pyramid, (c) 1 mm hexagon coated with Ag**

As the  $SE_A$  values are much higher than -10 dB and the multiple reflections are negligible, effective absorption coefficient ( $A_{eff}$ ) would be of greater significance given the heterogeneities in the system. The effective absorption coefficient is given by:

$$A_{eff} = \frac{1 - R - T}{1 - R}$$

The  $A_{eff}$  values are almost equal to one indicating that the shield works on an absorption-dominated mechanism.

### Demonstration of EMI shielding property of the 3D printed structure

Figure S2 shows a simple demonstration of EMI shielding property and an application where shape memory triggered EMI shielding may be used. A Bluetooth module (HC-05) was connected to a mobile phone, and the connectivity of Bluetooth was tracked using an android application. Without the EMI shield, the Bluetooth module will remain connected to the phone, however as soon as the chip was shielded, the connectivity was lost. Shape memory property can be used to trigger such on and off EMI shielding in electronic devices.

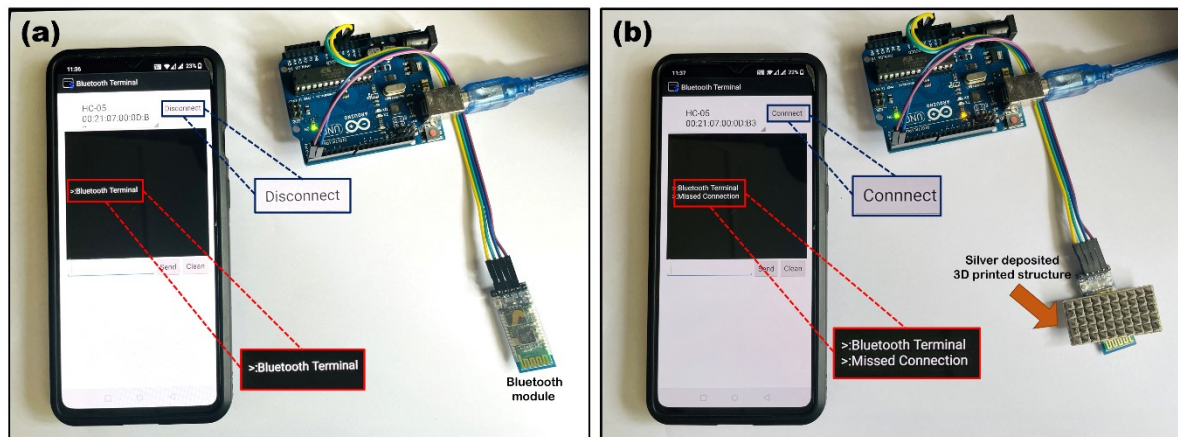


Figure S2: (a) Bluetooth Module connected to a mobile phone via android application, (b) the application showing “Missed Connection” after the 3D printed structure is placed on the module.