**Fig S1**

(a) Spectra showing the absorbance (arb. units) of Cu, Ag, and Au nanostructures as a function of wavelength (nm). (b) Absorbance spectra of Cu-TMG1, Ag-TMC1, and Au-TMO1 nanostructures.

**Fig S2**

Graph showing the time dependence of storage modulus (G') and loss modulus (G'') for Cu nanomaterials. The modulus values are plotted on a logarithmic scale (10^4 to 10^7) as a function of time (0.01 to 10 hours).
Fig S5b

Graph showing intensity vs. q (Å⁻¹) for Cu-TM/G1.
Fig S7
Fig S8
Fig S9a