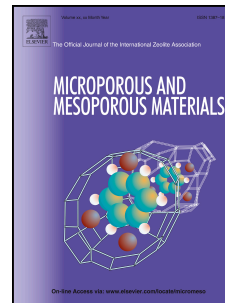


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## An Integrated Function System using Metal Nanoparticle@Mesoporous Silica@Metal-Organic Framework Hybrids

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### Abstract

Multifunctional triple-compartment hybrids consisting of Au nanoparticle (NP)@mesoporous silica ( $m\text{SiO}_2$ )@metal-organic framework (MOF) have been successfully synthesized via selective nucleation and growth on the surface of NP@ $m\text{SiO}_2$  nanostructures. Most importantly, these hybrids possess unique dual independent pores with different pore sizes based on  $m\text{SiO}_2$  and MOF for loading of larger organic molecules and sieving of smaller organic molecules. Through characterization of the pore properties of both porous materials, triple-compartment hybrids can be employed in sensing materials on the basis of the fluorescence properties of the doped fluorescent molecules within the  $m\text{SiO}_2$  phase and the molecular sieving effect of MOF. These hybrid nanostructures also show plasmonic properties due to the Au NPs.

### Keyword

Mesoporous silica, Metal-organic frameworks, Inorganic nanoparticles, Nanocomposites, Fluorescence sensor

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