

[PO-F2]Poster Session 2

Symposium F

2018年10月31日(水) 17:45 ~ 20:00 Poster Hall

[P2-43]Design of spontaneous formation-based 3D plasmonic optical structure, using multiphysics modeling

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Oil droplets in water or water droplets in oil have been generated fascinating science and utilized in enormous applications from medicine to energy harvesting. However, the creation of integrated three-dimensional architectures by liquid droplet and immiscible liquid interface is relatively less investigated. Here we report interfacial energy-driven and spontaneous formation of plasmonic cavity at room temperature without an external force. With the multiphysics approach considering the densities and interfacial energies of two different liquids, we simulated the spontaneous formation of cavity when a liquid water droplet meets immiscible liquid interface. At the interface, the metal ions in the liquid droplet are automatically reduced and they form the interfacial plasmonic layer onto the cavity surface. Due to the both optical cavity and integrated plasmonic structure, the significantly enhanced fluorescence is obtained by 1000 times. We believe our findings could offer a new avenue and advance in a variety of photonic and plasmonic materials and devices.