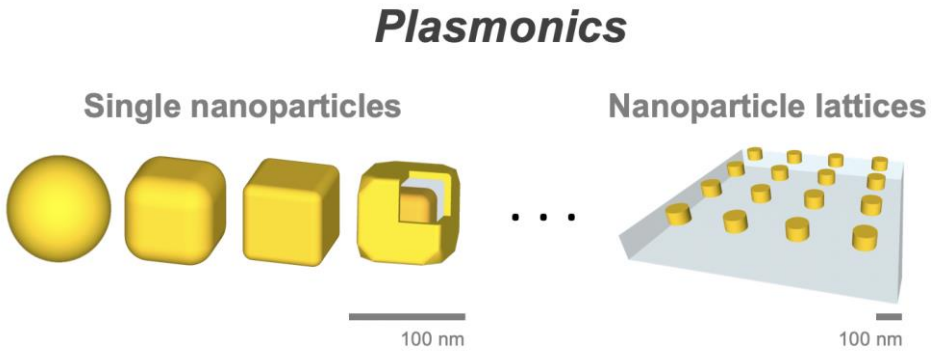
화학과 세미나

박정은 교수
GIST 화학과

Exploring Nanoparticle Plasmonics

Plasmonics studies the interaction between light and matter at scales below the diffraction limit. Metal-based plasmonic materials can be reliable tools for obtaining desired near-field and far-field properties due to their flexible shapes and geometries. In this presentation, I will first introduce the highly controlled synthesis of cubic gold nanoparticles. Their uniform structures and strong plasmonic effects have allowed us to achieve reproducible surface-enhanced Raman scattering signals and the highest metal luminescence quantum yield. In the latter segment of my talk, I will transition to a discussion on collective systems. The beauty unfolds when nanoparticles are periodically arranged in two dimensions, allowing individual plasmon modes to diffractively couple with each other, thus supporting surface lattice resonances. By integrating plasmonic lattices with perovskites, we investigated the light-matter interaction between plasmons and excitons in both weak and strong coupling regimes, revealing unique optical feedback mechanisms for lasing and ultrafast dynamics of strongly coupled perovskites.



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