Title : Plasmonic Nanocrystals for Infrared Optics: Synthesis & Application

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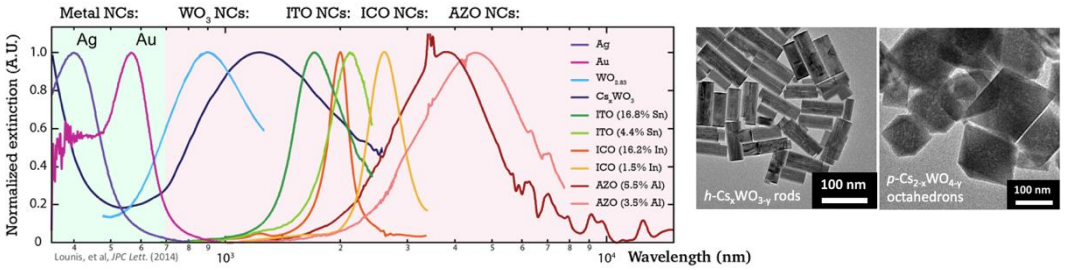
Research Area: Materials Science, Condensed Matter Physics

Methods: Colloid science and chemistry, Electron microscopy, X-ray analysis, Micro-spectroscopy

PhD track subject: Free electrons in metal nanoparticles exhibit 'localized surface plasmon resonance' (LSPR) with utmost efficiency of light-matter interaction. Current technologies for lighting, imaging, health care, and energy harvesting essentially utilize the LSPR phenomenon. Our group challenges to host LSPR in doped semiconductor nanocrystals instead of metal, which creates a new paradigm of '*switchable LSPR*'. Semiconductors also extend the spectral range of LSPR across the entire infrared region where: solar energy is abundant, biological tissues are transparent, and molecular vibrations are resonant. This PhD track project proposes to develop nanocrystal-based plasmonic material for applications to biomedical analysis or solar energy harvester.



References:

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Lordes et al, *Nature*. 500, 323 (2013)

Kim et al, *Nano Letters*. 15, 8, 5574-5579 (2015)