

First Laureate, Fundamental Research

- **Research Work Title:** Colloidal plasmonic metal nanocrystals
- **Researcher:** Prof. Jianfang Wang
- **Country:** China, (Hong Kong)
- **Field:** Nanomaterials and Nanophotonics
- **Scientific Affiliation:** The Chinese University of Hong Kong



Abstract:

Plasmonic metal nanocrystals possess synthetically controllable plasmon resonance wavelengths, extremely large light absorption/scattering cross-sections and enormously enhanced local electromagnetic fields. They can dramatically alter the light absorption and emission of other optical species. Upon resonant excitation, they can efficiently generate hot charge carriers. Due to these attractive properties, plasmonic metal nanocrystals have found wide applications in optics, metamaterials, spectroscopy, chemical and biological sensing, nanomedicine, photocatalysis and solar energy harvesting. Robust wet-chemistry approaches have been developed for the synthesis of colloidal plasmonic metal nanocrystals out of different metals in different shapes. The synthesized metal nanocrystals are in high purity and high shape and size uniformity. Their plasmon resonance wavelengths can be controlled from the visible (~400 nanometers) to mid-infrared region (~10 micrometers). Systematic experimental, numerical and theoretical studies have been performed, deep understanding on the plasmonic properties of metal nanocrystals has been achieved, and different technological applications have been explored.

Biography:

Prof. Jianfang Wang obtained BS degree in inorganic chemistry and software design from University of Science and Technology of China in 1993, MS degree in inorganic chemistry from Peking University in 1996, and PhD degree in physical chemistry from Harvard University in 2002. He did postdoctoral research in University of California, Santa Barbara from February 2002 to July 2005. He joined in Department of Physics of The Chinese University of Hong Kong as an assistant professor in 2005 and became an associate professor in 2011 and a full professor in 2015. During his graduate studies and postdoctoral research, he worked on rare earth separation, semiconductor nanowires and mesoporous materials. His current research interests focus on metal nanocrystals for nanoplasmonics and nanophotonics, and metal oxide nanostructures for photocatalysis. He has published more than 170 papers.

