

THE DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING SPEAKER SERIES

PRESENTS

Novel Optical Properties of Plasmonic Metal Nanostructures: *A Case Study of Hollow Gold Nanospheres (HGNS) and Their Applications in Sensing and Cancer Therapy*



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Room W122, Engineering Building 2

LECTURE ABSTRACT

As an important member of the family of plasmonic metal nanostructures, hollow gold nanospheres (HGNS) exhibit unique optical and photothermal properties useful for many applications including SERS (surface enhanced Raman scattering) sensing, optical imaging, drug delivery, and photothermal therapy (PTT) of cancer. We have conducted extensive studies of the mechanism behind the growth of HGNS and determined the important role several factors including oxygen in the reaction process using a number of spectroscopic techniques including X-ray spectroscopy. Based on the better understanding of the growth mechanism, we are able to control the synthesis of HGNS with well-defined size and shell thick, allowing surface plasmon resonance (SPR) at specific wavelength to be achieved, especially the highly desired near IR (NIR) region. In addition, we can control the surface morphology of the HGNS by varying surface ligand molecules. The synthesized HGNS have been used for in vitro studies of HGN-mediated PTT of oral squamous cell carcinoma (A431), with the primary goal to optimize the bioconjugation (protein vs peptide targeting ligands) and the HGNS (size and SPR) for best PTT performance. I will also give some background information about our previous work that led to the development of the HGNS.

SPEAKER BIOSKETCH

Jin Z. Zhang received his B.Sc. degree in Chemistry from Fudan University, Shanghai, China, in 1983 and his Ph.D. in physical chemistry from University of Washington, Seattle in 1989. He was a postdoctoral research fellow at University of California Berkeley from 1989 to 1992. In 1992, he joined the faculty at UC Santa Cruz, where he is currently full professor of chemistry and biochemistry. Zhang's recent research interests focus on design, synthesis, characterization, and exploration of applications of advanced materials including semiconductor, metal, and metal oxide nanomaterials, particularly in the areas of solar energy conversion, solid state lighting, sensing, and biomedical detection/therapy. He has authored near 300 publications and three books. Zhang has been serving as a senior editor for JPC published by ACS since 2004. He is a Fellow of AAAS, APS, and ACS. He is the recipient of the 2014 Richard A. Glenn Award of the ACS Energy and Fuel Division.

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