

Sustainable Plasmonics and Plasmonics for Sustainability

By

Prof Naomi J. Halas

Stanley C. Moore Professor of Electrical and Computer Engineering Rice University, USA

Date: 25 July 2016 (Monday)
Time: 4.00pm - 5.00pm
Venue: MAS Executive Classroom 2 (SPMS-MAS-03-07)
Host: Prof Nikolay Zheludev



Abstract

The intense research activity of the past two decades focused on the collective electronic oscillations in high-electron-density media, known as surface plasmons, has led to multiple breakthroughs in fields ranging from chemical sensing and catalysis, to active optical devices, solar light harvesting, even nanomedicine. For many of these applications, the original focus on noble metals may ultimately limit their transition from the research laboratory to widely used commercial technologies. We will describe several research directions that, as they point towards more sustainable materials, open up new research opportunities. Aluminum, the most abundant metal on earth, opens the door to new colorimetric sensing applications and opportunities for active devices. In applications that directly address sustainability, we will discuss how plasmonic nanoparticles can be used for solar distillation of liquid mixtures, providing insight into the mechanism of nanoparticle-based distillation that in certain cases allows the distillation fraction to deviate dramatically from conventional thermal distillation processes

Short Biography

Naomi Halas is the Stanley C. Moore Professor of Electrical and Computer Engineering at Rice University, where she also holds faculty appointments in the Departments of Physics and Astronomy, Chemistry, and Bioengineering. She was a graduate research fellow at IBM Research, Yorktown, NY, and served as a postdoctoral associate at AT&T Bell Laboratories before she joined the Rice faculty. She is one of the pioneering researchers in the field of plasmonics, creating the concept of the “tunable plasmon” and inventing a family of nanoparticles with resonances spanning the visible and infrared regions of the spectrum. Halas pursues fundamental studies of coupled plasmonic systems as well as applications of plasmonics in biomedicine, optoelectronics, chemical sensing, photocatalysis, and solar energy, with a novel ‘solar steam’ technology. She is a recipient of the American Physical Society Frank Isakson Prize for Optical Effects in Solids and the R. W. Wood Prize of the Optical Society of America. She is author of more than 250 refereed publications, has more than fifteen issued patents, and has presented more than 500 invited talks. She was co-founder of Nanospectra Biosciences, a company developing photothermal cancer therapies based on her nanoparticles, currently in clinical trials. She is a Member of the National Academy of Sciences, the National Academy of Engineering, the National Academy of Inventors (all USA), the American Academy of Arts and Sciences, and a Fellow of the APS, OSA, IEEE, SPIE, MRS, and AAAS. She is a member of the Editorial Advisory Board of Chemical Physics Letters, Laser and Photonics Reviews, ACS Photonics, and an Associate Editor of Nano Letters