Defense Announcement

3D Plasmonic Nanoarchitectures: Fabrication, Characterization, and Applications

Md Masud Arnob

Degree: **PhD, Electrical Engineering**

Date: 12/01/2017 Time: 11 am

Location: ECE large conference room

Committee Chair: Dr. Wei-Chuan Shih

Committee Members: Dr. John C. Wolfe
Dr. Wanda Wosik
Dr. Ji Chen
Dr. Wei-Kan Chu

(Abstract/Summary)

Plasmonic nanomaterials are known to concentrate incident light to their surfaces by collective electron oscillation. Plasmonic hot-spots refer to locations where electromagnetic fields are particularly enhanced relative to the incident field. Traditional plasmonic nanomaterials are 1D (e.g., colloidal nanoparticles) or 2D (lithographically patterned nanostructure arrays) in nature, which typically result in sparse field concentration patterns. To improve efficiency and better utilization of hot-spots, we investigate 3D plasmonic architectures where abundant hot-spots are formed in a 3D volumetric fashion, a feature drastically departing from traditional nanostructures. Fabrications, characterizations, and applications of two different 3D plasmonic metal nanostructures are described. One is nanoporous gold plasmonic nanoparticles with meshed network of Au ligaments and air pores. Another is a facile technique where 3D plasmonics can be obtained from chicken egg shell, a day-to-day waste material.