

PLASMONIC AU NANOSTRUCTURES FOR SURFACE-ENHANCED RAMAN SPECTROSCOPY

Xin Sun

Dr. Hao Li, Dissertation Supervisor

ABSTRACT

Surface-enhanced Raman spectroscopy (SERS) is a powerful analytical tool that can identify chemical species at trace levels thanks to the so called localized surface plasmon resonance. In this dissertation four plasmonic Au nanostructures, namely, faceted ZnO/Au nanonecklace arrays, Au nanoisland arrays, nanoporous Si/Au composites and plasma coated SERS-active nanostructures, will be discussed with regards to their fabrication, characterization, optimization and evaluation for SERS applications. In the end, a summary on these four plasmonic Au nanostructures will be reviewed against the standards of high quality SERS substrates, and corresponding recommendations will be proposed to further improve the SERS performance.