

# Synthetic Strategy and Optical Property Characterization of Complex Nanorods: Plasmon Wave Guide and Solar Cell

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In this talk, we represent a novel approach to investigating intra-nanorod surface plasmon coupling with control over block compositions. The multi-component rod-like nanostructures, which consist of optically active components (Au and Ag) and optically less active component (for example, Ni) in UV-vis-NIR spectral window, showed interesting optical response depending on each block length and the total length of the structure. By controlling the composition and relative lengths of the blocks that comprise these structures, we can tailor the overall optical properties. Depending on the relative fraction of Au and Ag blocks, the intensity of the transverse modes varied without noticeable peak shifts. However, the strong intraparticle surface plasmon coupling resulted in the collective appearance of longitudinal LSP modes, including higher-order modes. The experimental observations were confirmed by theoretical calculation, using a discrete dipole approximation method. In addition, we will briefly discuss how single nanorod solar cells can be synthesized by using electrochemical deposition and AAO hard templates.

**Keywords:** Nanorod, Solar Cell, Plasmon wave guide, Surface plasmon, AAO