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Electrochemically Grown, Composite Au/CdS/Au Nanowires: Structural and Optical Properties TODD BRINTLINGER, RHONDA STROUD, JAMES LONG, U.S. Naval Research Laboratory, STEFANIE SHERRILL, SANG BOK LEE, Univ. of Maryland, BLAKE SIMPKINS, U.S. Naval Research Laboratory — We present growth, characterization, and optical response of solution-synthesized nanoplasmonic structures coupled with nonlinear dielectrics. Transmission electron microscopy indicates the templated electrochemical growth of 60-300 nm diameter, 200-5000 nm long composite Au-CdS-Au cylindrical nanostructures yield wurtzite CdS spanning small gaps between Au nanowires. The electrodeposited CdS exhibits an absorption band at $\sim$ 500 nm consistent with band edge absorption of crystalline CdS and broad defect band luminescence centered $\sim$ 625 nm. CdS exhibits sufficient quality to produce second harmonic generation stimulated with a pulsed, linearly polarized pump-light from a femtosecond Ti-sapphire laser. The effect of structure geometry and environment on optical response is investigated through variations in substrates, growth parameters and focused-ion-beam (FIB) shaping of nanostructures.

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