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Optimized growth of gold nanobars for energy responsive applications. ERIK HOBBS, ANTHONY JOHNSON, CACIE HART, DAVID SCHAEFER, RAJESWARI KOLAGANI, Department of Physics, Towson University, MARY SAJINI DEVADAS, Department of Chemistry, Towson University — The aim of this research is to create a reliable protocol for the synthesis of plasmonic gold nano bars for energy responsive applications such as light harvesting. The mechanism of growth in these metallic structures is not fully understood. Symmetry breaking by twinning introduces anisotropy in the shape of the nanostructures. This also results in the formation of highly faceted tip geometries that support the propagation of surface plasmon polaritons. Gold nanobars have been synthesized through chemical reduction in the presence of surfactants: cetyltrimethylammonium bromide (CTAB) and polyvinylpyrrolidone (PVP). Synthesis is executed by varying the concentrations of CTAB and PVP, as well as adjusting the growth temperature. The influence of additives such as metal ions will be presented. Resulting plasmonic gold nanobars are viewed using darkfield microscopy and scanning electron microscopy to visualize the nanoparticle product mixture. Atomic force microscopy is employed to measure the length and width of the nanobelts. X-ray diffraction determines the degree of crystallinity in the synthesized gold nanobars.

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