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Growth and Characterization of ZnSe Nanowires on Au-catalyzed Ge substrates[1] TINA LIN, BENJAMIN COOLEY, NITIN SAMARTH, Dept. of Physics, Penn State University, University Park PA 16802 — Semiconductor nanowires derived from ZnSe are of interest for semiconductor spintronics because of the relatively long spin lifetimes in bulk n-ZnSe. The metal-catalyzed growth of ZnSe nanowires has already been demonstrated on a variety of substrates, including GaP and Si.[1,2]. Here we exploit the formation of a low melting point Au-Ge eutectic alloy to initiate the growth of ZnSe nanowires on Au-covered Ge substrates. ZnSe is deposited under ultrahigh vacuum conditions using solid source molecular beam epitaxy. Scanning electron microscopy reveals the formation of dense random arrays of ZnSe nanowires with typical lengths in the range $\sim 1-3\mu$m and diameters of $\sim 10-30$ nm. We report a systematic study of the effects of growth temperature, thickness of the gold layer, and ZnSe deposition thickness on the characteristics of the resulting ZnSe nanowires. We also report characterization of these nanowires using high resolution scanned probe and electron microscopies, as well as low temperature optical spectroscopy.

1. Y. F. Chan *et al.*, Appl. Phys. Lett. 83, 2665 (2003).
2. A. Colli *et al.*, Nanotechnology 16, S139 (2005).

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