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Polarization dependent photoluminescence studies of InP nanowires[1] LEI FANG, XIANWEI ZHAO, FENGYUAN YANG, EZEKIEL JOHNSTON-HALPERIN, Department of Physics, The Ohio State University — Control of the polarization anisotropy observed in measurements of single NWs has the potential to enable both fundamental studies of polarization-sensitive electronic states and potential applications in polarization-sensitive photodetectors. This anisotropy is caused by the large dielectric mismatch between the semiconductor nanowire and the environment (air), which suggests that with appropriate dielectric matching it is possible to minimize or eliminate polarization anisotropy. In order to explore this possibility, we measure the polarization dependence of ensembles of InP nanowires grown by pulsed laser deposition. The measured polarization response of these ensembles correlates well with the straightforward extension of previous models developed to describe single wire measurements. Further, initial studies involving coating InP nanowires with tantalum oxide, whose dielectric constant (5.76 to 8.41) is close to that of InP (9.61), reduces the polarization anisotropy by 20%. These preliminary results will be presented and proposed strategies for more dramatic suppression will be discussed.

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