## Twin Formation in InP Nanowires Epitaxially Grown on Germanium and Silicon

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Semi conducting nanowires are promising for the integration of III-V based functionalities with Silicon technology. In this work the hetero-epitaxial growth of Indium Phosphide (InP) wires on Germanium and Silicon with a <1.1.1> orientation is discussed. Gold-mediated VLS growth of these wires was performed using either MOCVD or laser ablation. The epitaxial relation between wire and substrate was studied using SEM, cross-sectional TEM and X-Ray Diffraction.

On both Germanium and Silicon substrates, perfect epitaxy of InP was observed, despite the large lattice mismatch of 4% and 8%, respectively. The formation of a series of additional InP orientations was observed with X-Ray Diffraction pole figure measurements. All observed orientations could be ascribed to the presence of rotation twins in the <1.1.1> growth directions and at the substrate wire interface. The presence of some and absence of other orientations could be explained by the occurrence of multiple twinning at the initial stage of wire growth.

Keywords: twinning, iii-v semiconductors, nanowires