Abstract Submitted
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Unusual Germanium Nanowire Crystal Structures Formed During Low Temperature Catalytic Growth[1] ANDREW GAMALSKI, Dep. of Engineering, University of Cambridge, JERRY TERSOFF, IBM T. J. Watson Research Center, CATERINA DUCATI, Dep. of Materials Science and Metallurgy, University of Cambridge, RENU SHARMA, Center for Nanoscale Science and Technology, National Institute of Standards and Technology, STEPHAN HOFMANN, Dep. of Engineering, University of Cambridge — Implementing bottom-up grown semiconductor nanowires (NW) in technological applications will require a detailed understanding of the electronic/physical properties of the NWs, which are closely related to their crystal structure. We present environmental transmission electron microscopy video data of Au catalyzed Ge NW growth under digermane exposure at 240 – 320 $^{\circ}$C. The catalyst particles are initially liquid after gas exposure [1], and Ge NWs temporarily grow by step flow from the liquid AuGe alloy [2] before the liquid catalyst crystallizes into a metastable solid phase. Nucleating solid Ge at low temperatures requires a considerable supersaturation in the liquid catalyst, which drives the formation of a NW with a non-equilibrium crystal structure [3]. We explore how nanoscale systems with high supersaturations lead to the formation of metastable phases whose properties can be dramatically different from those of the common bulk phases. [1] A. D. Gamalski *et al.*, Nano Lett., 10, 2972 (2010) [2] A. D. Gamalski *et al.*, J. Phys. Chem. C, 115, 4413 (2011) [3] A. D. Gamalski *et al.*, in preparation

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Andrew Gamalski
Dep. of Engineering, University of Cambridge

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