Kinetic measurements during the vapor-liquid-solid growth of Si and Ge nanowires
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Growth of nanowires using vapour-liquid-solid (VLS) process has been successfully demonstrated over the past 40 years, but the exact mechanisms are not well understood. In this talk, we will present in situ transmission electron microscopy studies of Si and Ge nanowire growth kinetics as a means to develop a fundamental understanding of the mechanisms governing their shape and structure. From the images of the wires, collected at video rates as a function of growth pressure, temperature, and gas environment, we identify several novel aspects of wire growth: Ostwald ripening of catalyst droplets on top of the wires, effect of oxygen on Si wire morphology, and VLS growth of Ge wires at temperatures below the bulk Au-Ge alloy eutectic temperature. We will consider the generality and applicability of these results for the growth of nanowires of other materials.