Supplementary Material (ESI) for Journal of Materials Chemistry

Electronic Supplementary Information

Synthesis of copper silicide nanocrystallites embedded in silicon nanowires for enhanced transport properties

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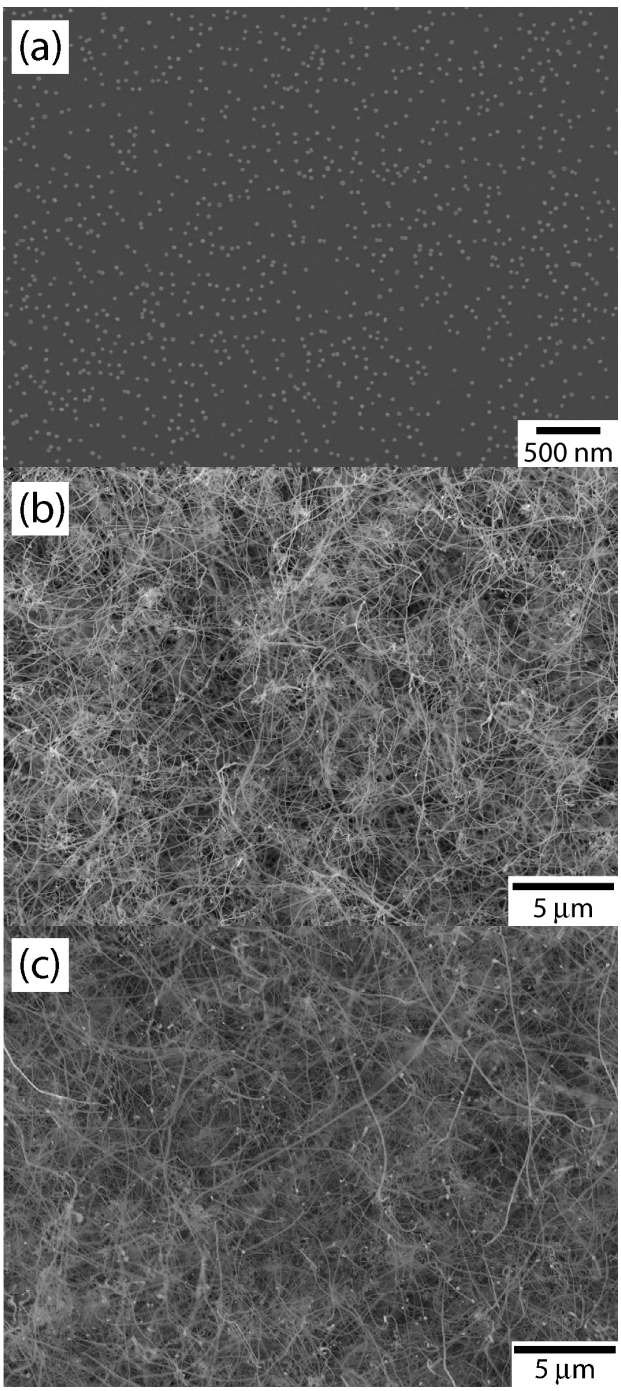

Fig. S1 SEM images of (a) the Si(100) growth substrate heavily seeded with 30 nm Au particles, (b) Si nanowires grown a Si(100) substrate via the VLS growth mechanism, and (c) Cu_3Si doped Si nanowires grown on a Si(100) substrate via the VLS growth mechanism.

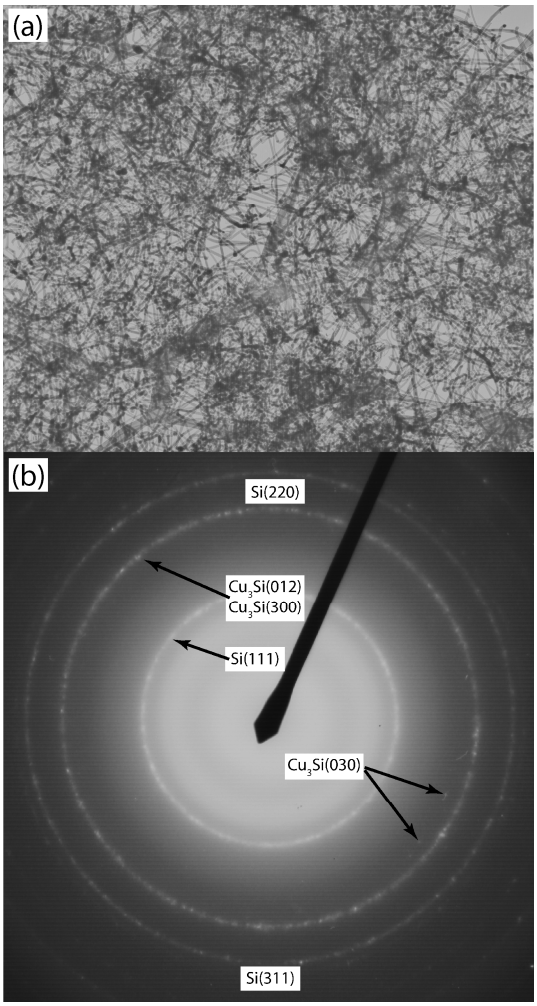

Fig. S2 (a) TEM image of a cluster of doped Si nanowires and (b) the corresponding indexed SAED pattern. In addition to the Cu_3Si (030) reflection, the strongest Cu_3Si peaks identified using x-ray diffraction, Cu_3Si (012) and (300), are also observed as an inner broadening of the Si (220) ring.

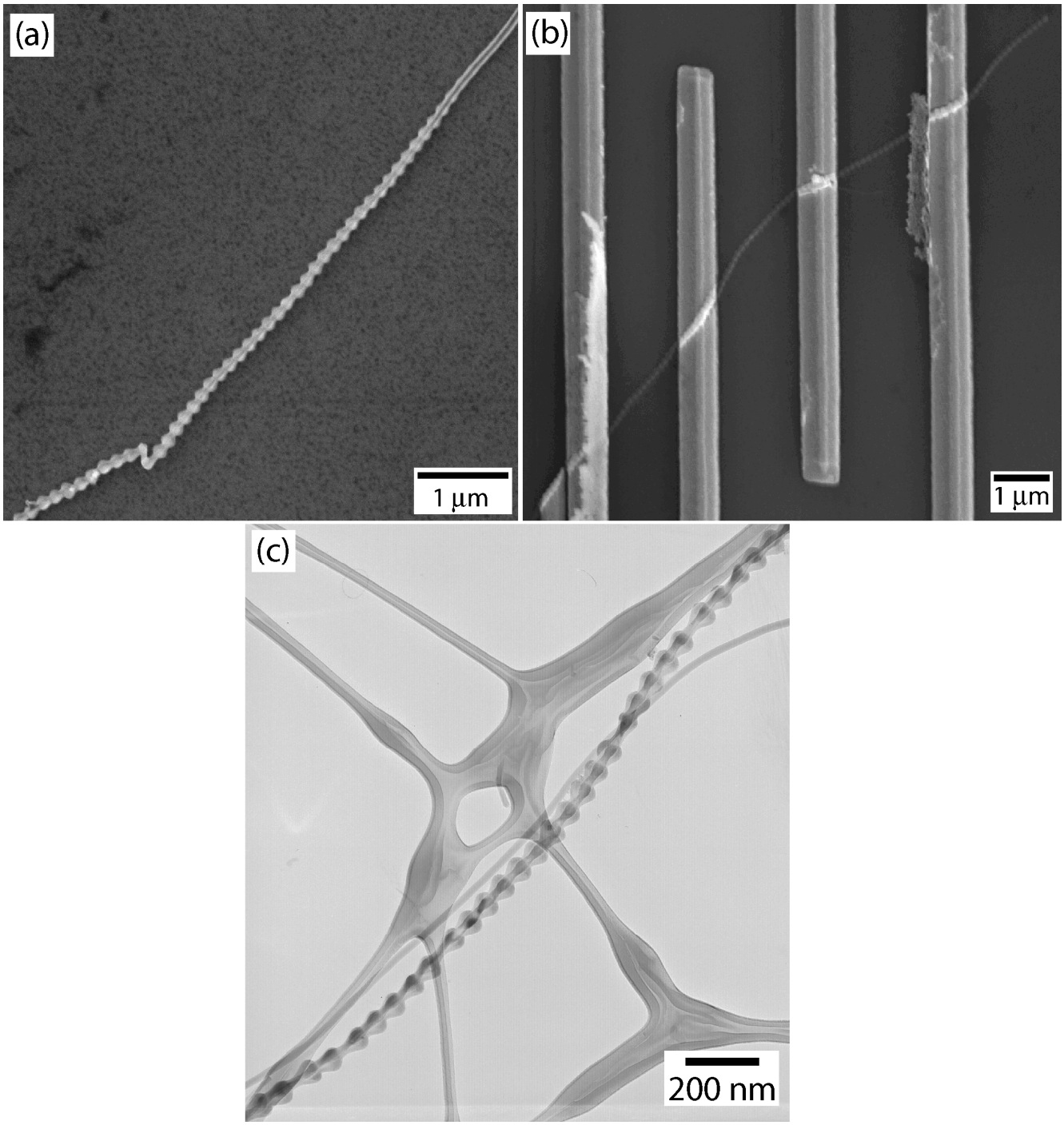

Fig. S3 SEM, panels (a) and (b), and TEM, panel (c), images of the nanofaceted minority product grown on a Si(100) substrate heavily seeded with 30 nm Au particles. The occurrence of this nanowire morphology is approximately less than 1 percent when compared to the straight nanowires.

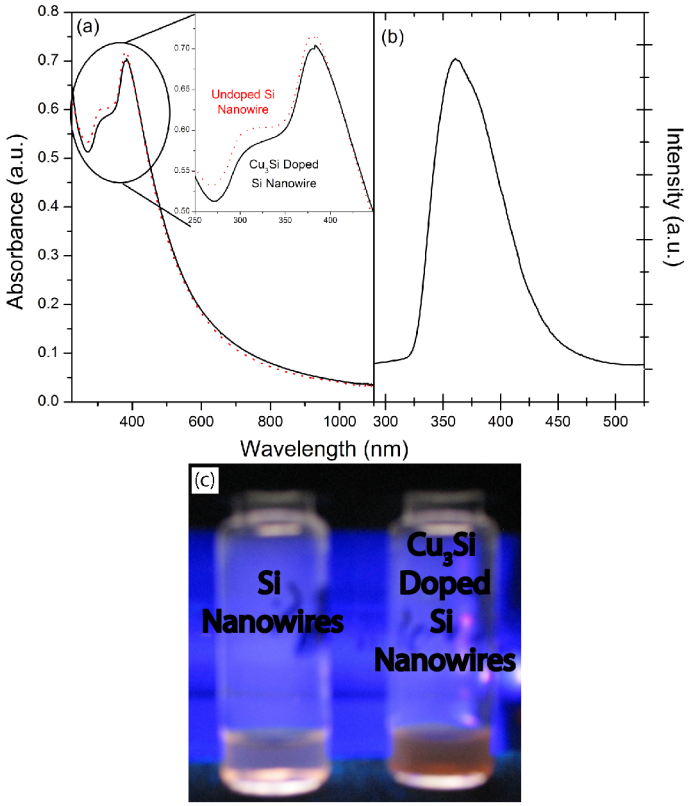

Fig. S4 Characteristic spectra of undoped and doped Si nanowires suspended in 2-propanol. Panel (a) contains UV-VIS absorbance spectra of the wires with an inset magnifying the important region of the spectrum. Panel (b) contains a photoluminescence spectrum of Si nanowires doped with Cu_3Si in which a shoulder at higher wavelengths is observed as a result of the Cu and Cu_3Si doping. Image (c) is the luminescence of the undoped and doped samples under UV radiation.