

Figure 1 Bright-field cross-section TEM images obtained from the Si/SiSn/Si multilayer system after MBE growth (a); thermal treatment at 900 C for 20 min (b); and after subsequent He⁺ irradiation of 27 keV for $6 \times 10^{14} \text{ cm}^{-2}$ at 250 °C (c).

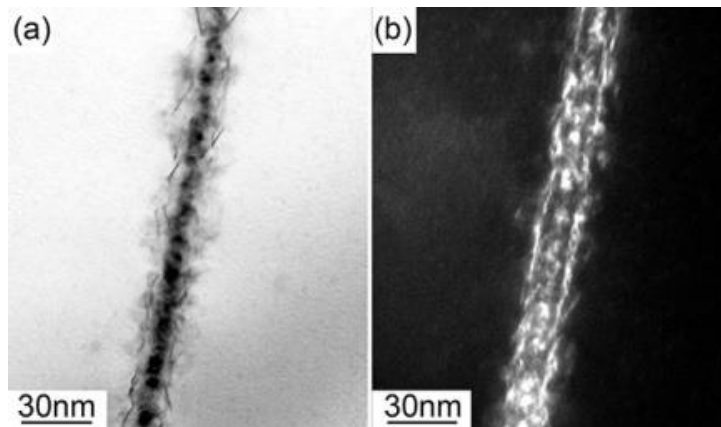


Figure 2 Bright field (a) and dark-field (b) cross-section TEM images of the layered Si/SiGe/Si structure after MBE growth and implantation of $2 \times 10^{15} \text{ cm}^{-2}$ carbon ions at 525 °C. Length of the scale is 30 nm.

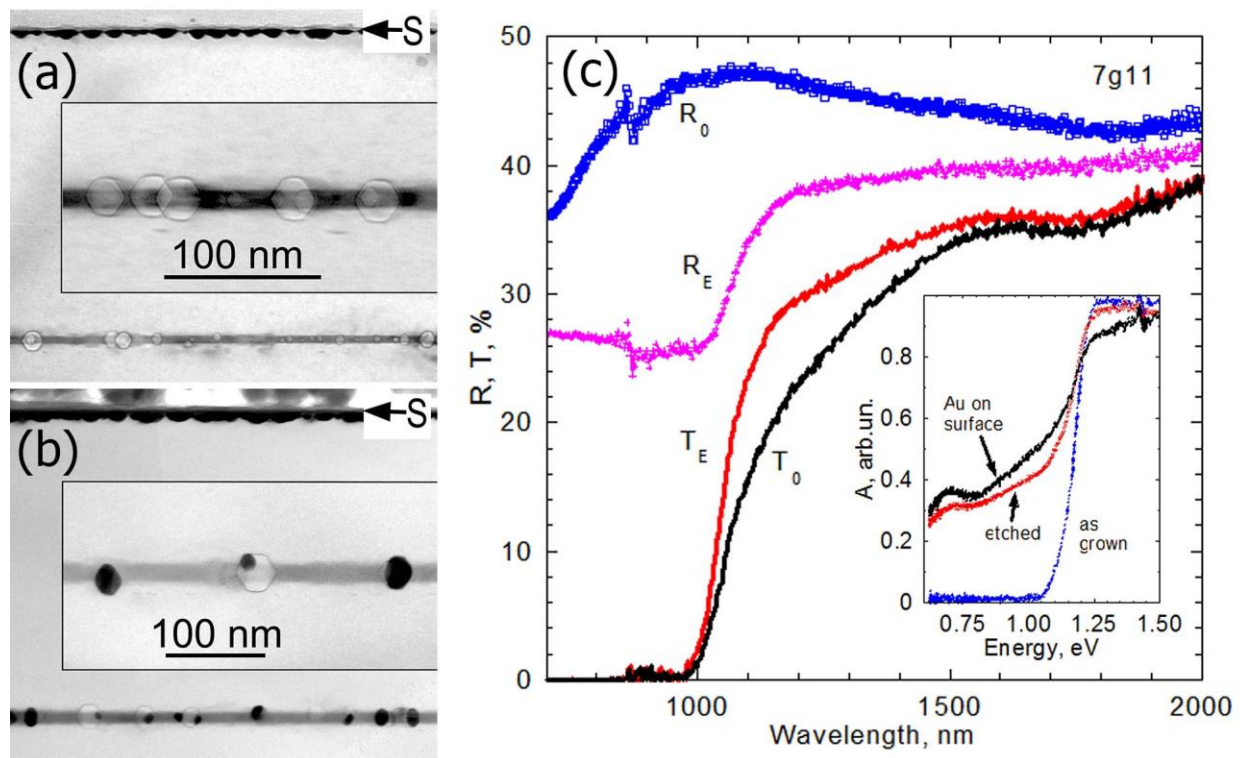


Figure 3 (a,b) - TEM images of MBE grown Si/SiGe/Si structure after deposition of 2.5 nm Au, He⁺ implantation (60 keV, $6 \times 10^{15} \text{ cm}^{-2}$, 250 °C) and annealing at 700 °C (a), or 850 °C (b). Insets are enlarged images of voids with segregated Au (nano-shells and particles).

(c) - Transmission (T), Reflection (R) and Absorption (A) spectra for the multi-layered structure of sample (a). Subscripts indicate samples before (0) or after (E) chemical etching of the surface Au layer. The absorption spectrum for an as-grown sample (before Au deposition) is shown for comparison.

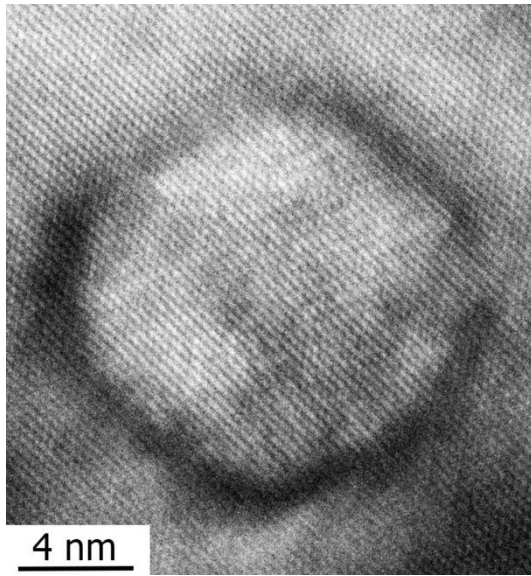


Figure 4 High resolution TEM image of a nano-void with metallic covering (nano-shell).

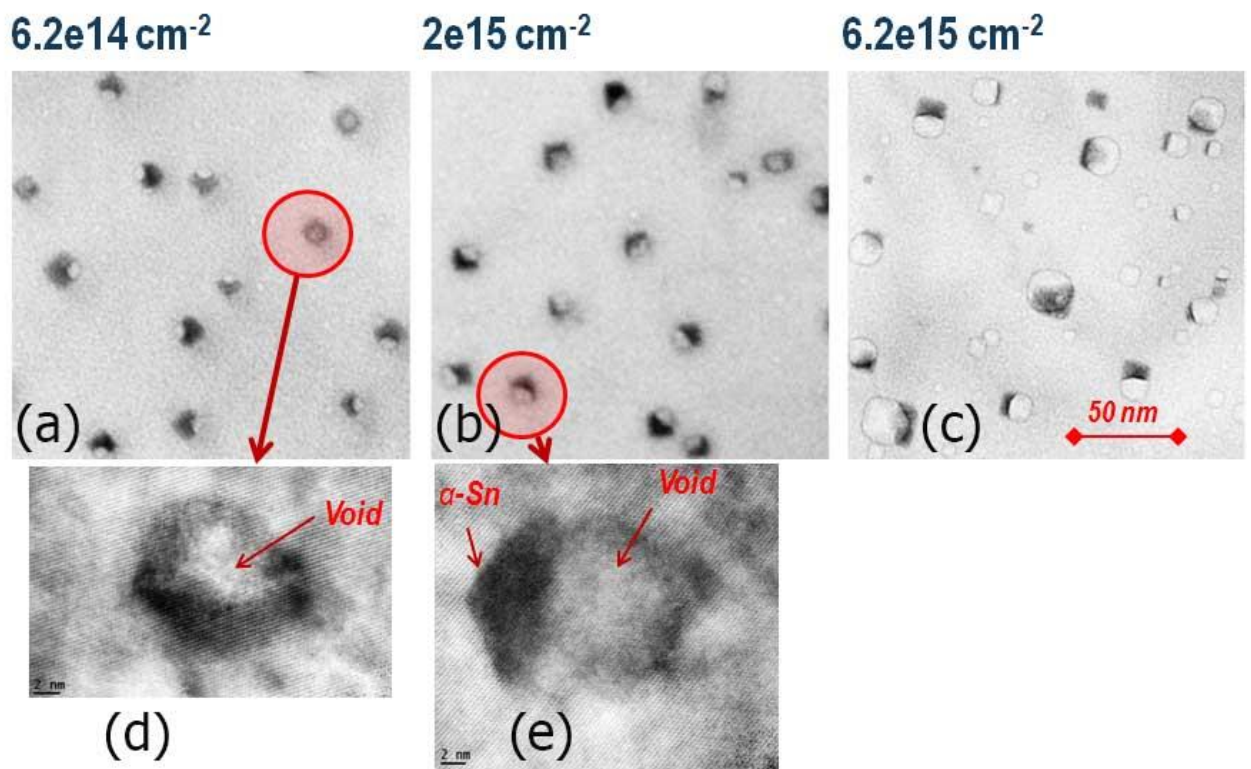
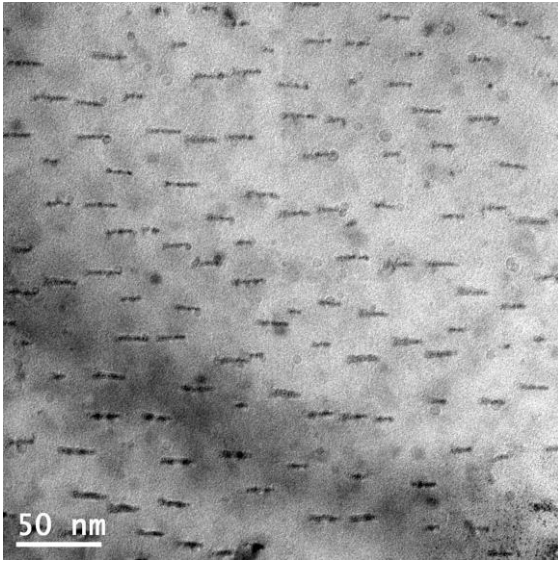
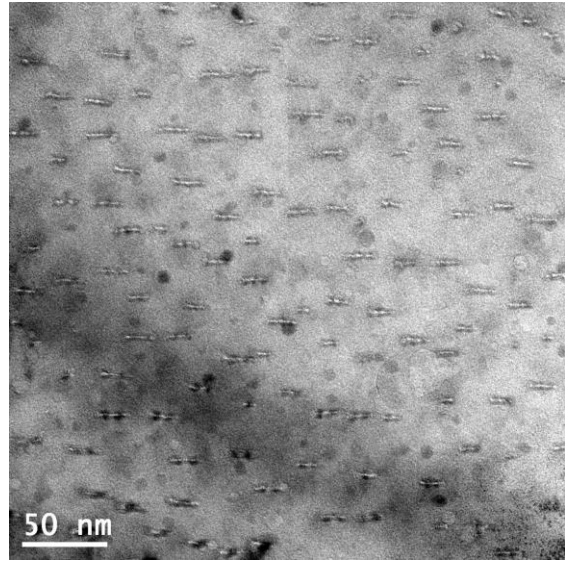


Figure 5 PV-TEM images of the voids in Sn-dots as a function of He^+ implantation dose. Pictures (d) and (e) are TEM images of high (atomic) resolution for selected void-centered precipitates of alpha-Sn.



(a)



(b)

Figure 6 Plan-view TEM micrographs of the structure in highly antimony doped multi-layered Si/SiGe sample after MBE growth followed by hydrogen plasma treatment at 280 °C at bias of 500 V and current density of $\sim 90 \mu\text{A cm}^{-2}$ for 30 min and thermal treatment at 730°C. (a) – focused and (b) – under-focused TEM images.