

Influence of crystallinity on the Rayleigh instability of gold nanowires

Karim S, Toimil-Molares ME, Ensinger W, Balogh AG, Cornelius TW, Khan EU, Neumann R
JOURNAL OF PHYSICS D- APPLIED PHYSICS 40 (2007) 3767–3770

The influence of the crystalline structure of nanowires on their thermal instability has been systematically investigated. Both poly- and single-crystalline (SC) cylindrical nanowires with diameters 87 and 132 nm transform into chains of spheres during annealing at 600–700 °C. SC nanowires oriented along the $\langle 1\ 1\ 0 \rangle$ direction are found to be more stable, i.e. longer annealing times are needed for their complete transformation into sphere chains. Sphere size and spacing between adjacent spheres formed after decay are controlled by the crystallinity of the wires and both are larger in the case of SC nanowires.