

Electronic Supplementary Information

Orientation symmetry breaking in self-assembled $\text{Ce}_{1-x}\text{Gd}_x\text{O}_{2-y}$ nanowires derived from chemical solutions

1. HAADF Simulations

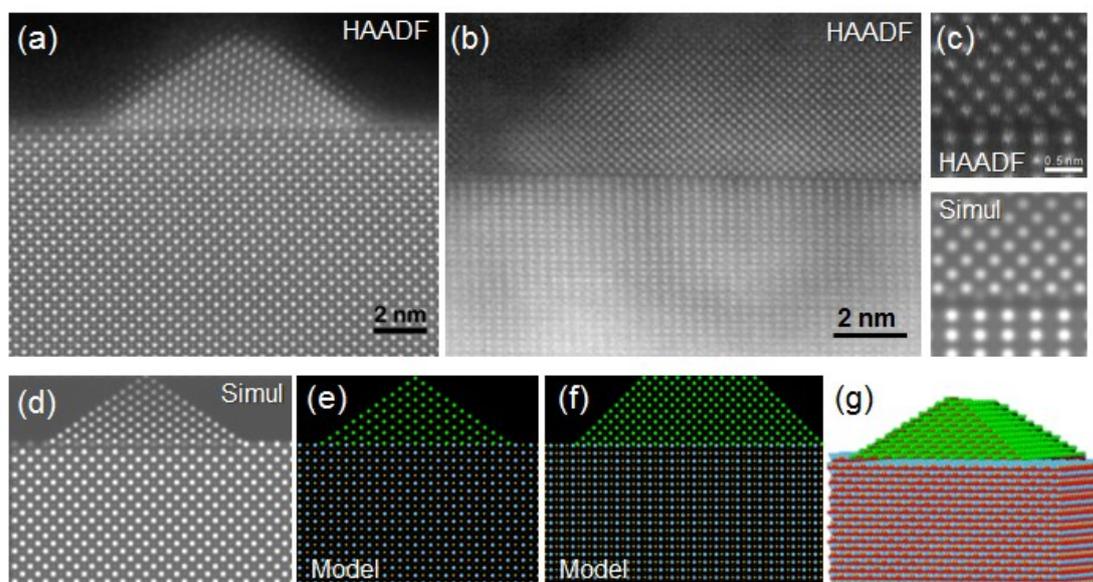


Figure S1. (a,b) Atomic resolution HAADF STEM images of the CeO_2 NWs on (011) LAO substrate, observed from two orthogonal directions showing the transverse cross-section of the NW in (a) and the longitudinal in (b). (c) Magnified detail of the heterointerface between the substrate and the NW (top) along with its simulated image (bottom). (d) Simulated HAADF image of the transversed cross-section of the NW. Image simulations performed with STEM-CELL software [1]. (e-g) Atomic 3D models of the system displayed in the two simulated projections (e,f) and in perspective view. Atomic 3D models constructed with Rhodius package [2].

2. Parameters used in thermodynamic calculations of nucleation

Island orientation	θ (°)	δ (°)	γ_t (J m ⁻²)	γ_a (J m ⁻²)	γ_b (J m ⁻²)	γ_s (J m ⁻²)
(011)CGO	35	45	2.45	$\gamma_{001}=3.25$	$\gamma_{111}=1.54$	$\gamma_{LAO(011)}=1.93$

Table S1. Surface energies for the CGO top (γ_t) and lateral facets (γ_a , γ_b), and for the (011)LAO ($\gamma_{LAO(011)}$) substrate. Angles between island and substrate θ and δ .

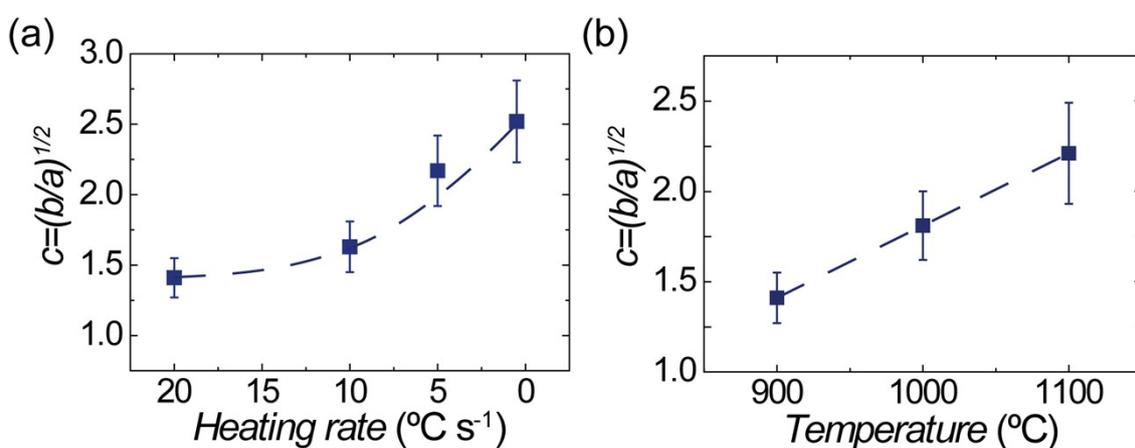


Figure S2. Dependence of the lateral aspect ratio c with (a) the heating rate and (b) temperature.

References:

- [1] V. Grillo, E. Rotunno, STEM_CELL: A software tool for electron microscopy: Part I—simulations, *Ultramicroscopy*, 125 (2013) 97-111.
- [2] S. Bernal, F.J. Botana, J.J. Calvino, C. López-Cartes, J.A. Pérez-Omil, J.M. Rodríguez-Izquierdo, The interpretation of HREM images of supported metal catalysts using image simulation: profile view images, *Ultramicroscopy*, 72 (1998) 135-164.