Abstract Submitted
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Isotropic and anisotropic strain-induced self-assembled oxide nanostructures MARTA GIBERT, PATRICIA ABELLAN, ALESSANDRO BENEDETTI, FELIP SANDIUMENGE, TERESA PUIG, XAVIER OBRADORS, Institut de Ciència de Materials de Barcelona, ICMAB-CSIC, 08193 Bellaterra, Catalunya, Spain — The apparition of new functionalities based on size- and shape-dependent properties requires strategies for the formation of well-defined structures at nanometric scale. We present a bottom-up low-cost chemically-derived methodology based on the control of strain and surface energies anisotropies in CeO2/LAO system to tune the lateral aspect ratio, orientation and kinetics of interfacial oxide nanostructures. Self-organized uniform square-based nanopyramids form under isotropic strain [1]. In contrast, highly elongated nanostructures (long/short axis $\sim$20) grow induced by biaxial anisotropic strain and anisotropic surface energies. Island's distinct crystallographic orientation is the clue of their differentiated shape, and also influences their distinct evolution. The kinetically-limited coarsening of isotropic nanodots contrasts with the ultrafast kinetics of anisotropic islands. Experimental analyses are based on AFM, TEM, XRD and RHEED, and simulations based on a thermodynamic model enables us to confirm the equilibrium shape of each sort of island's shape in relation to its misfit strain and surface characteristics. [1] Gibert, M. et al., *Adv.Materials* **19** (22), 3937 (2007).

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