Electronic Supplementary Material (ESI) for Nanoscale Advances.

Supplementary Information for: Observing Growth under Confinement: Sn Nanopillars in Porous Alumina Templates

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S1: Ex situ FIB-SEM images

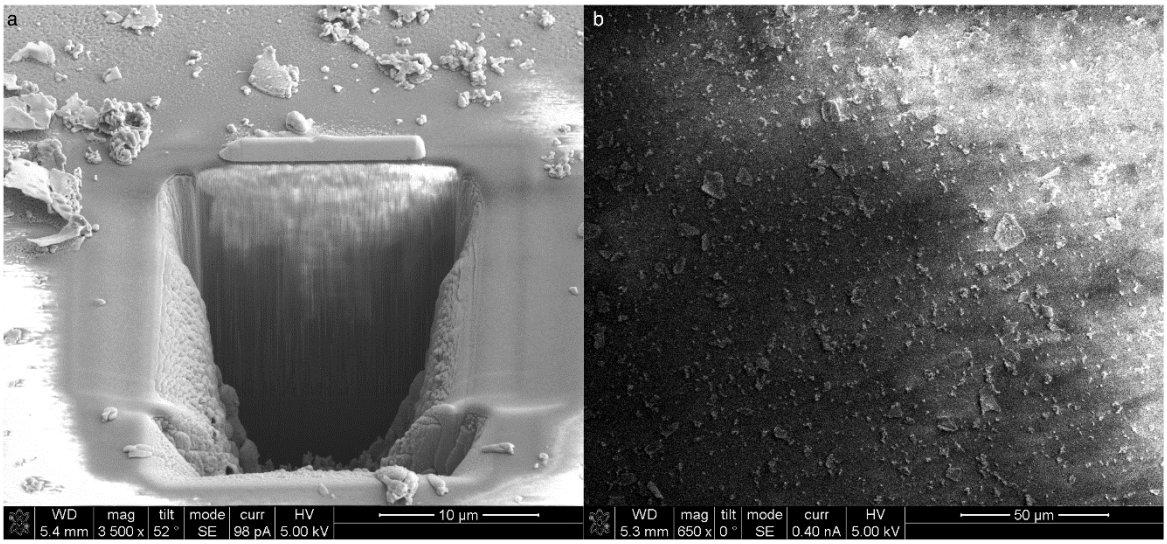

Figure S1: Ex situ FIB-SEM images showing the sample surface after electrodeposition. (a) Secondary electron image showing the top of the hole cut into the sample to reveal the cross-section. A stripe of Pt was deposited at the top of the cut to give a smooth cross-section, Sn particles on the surface can also be seen. (b) Secondary electron image showing part of the sample surface, a variety of Sn particles can be seen.

SI - Description of the analysis procedure for the diffraction patterns

For each image, four reflections have been analyzed:

- (020) and ($0\bar{2}0$) ($2\theta = 3.48^{o}/q = 2.15$ $Å^{-1}$), which correspond to out-of-plane information

- two symmetry-equivalent reflections of the (031) family ($2\theta = 6.15^{o}$/q = 3.79 Å^-1), which correspond to in-plane information

For each reflection, the following data have been analyzed:

- normalized peak intensity in arbitrary units (not shown)

- expansive strain in percent, calculated from the radial shift in peak position with respect to the tabular value; labelled in Figure 5a as “expansive strain”

- domain rotation offset in degrees, calculated from the azimuthal shift in peak position; not shown

- grain size in nanometers, calculated from the radial peak FWHM, “grain size” in Figure 5a

- rotational disorder in degrees, calculated from the azimuthal peak FWHM and indicated in Figure 5a as “rotational disorder”

Images were integrated both by column (i. e. radially) and by row (i. e. azimuthally). Each of these two 1D profiles was then fitted with a Gauss peak and a linear background, yielding five parameters for each fit: intensity (J), center or *mean* (μ) and *standard deviation* (σ) for the Gaussian, and bg_slope, bg_const for the *slope* and *intercept*, respectively, of the linear background approximation. The fitting algorithm (based on scipy.optimize.curve_fit []) then returns the five sought values and also a 5x5 covariance matrix. The five parameter errors were then calculated from the diagonal of the covariance matrix as $\sqrt{\mathrm{diag(covariance\_matrix)}}$

1) Expansive strain in percent was determined from radial profile as $\left(\frac{\mu-\mu_0}{\mu_0}\right) \cdot 100\%$, where μ_0 was the reference value. The error was calculated as $\left|\frac{100}{\mu_0 \cdot \delta\mu}\right|$ where $\delta\mu$ is a square root of a respective value in diagonal covariance matrix. Basically, $\delta\mu$ is the error of fitting algorithm in finding μ value.

2) Grain size in nm was determined from radial profile as $\frac{k}{\sigma}$, with σ_{rad} as radial standard deviation and k a proportionality coefficient $k = \frac{2\pi \cdot \mu}{23.548 \cdot q_{ip}}$. The error was calculated as $\left|\frac{-k * \delta\sigma}{\sigma^2}\right|$.

3) Rotational disorder was determined from azimuthal profile as $2.3548 * \sigma$, multiplied with the number of degrees per pixel (= 1). The error was calculated as $2.3548 * \delta\sigma$.