ADVANCED MATERIALS

Supporting Information

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Surfactant-Mediated Generation of Iso-Oriented Dense and Mesoporous Crystalline Metal Oxide Layers**

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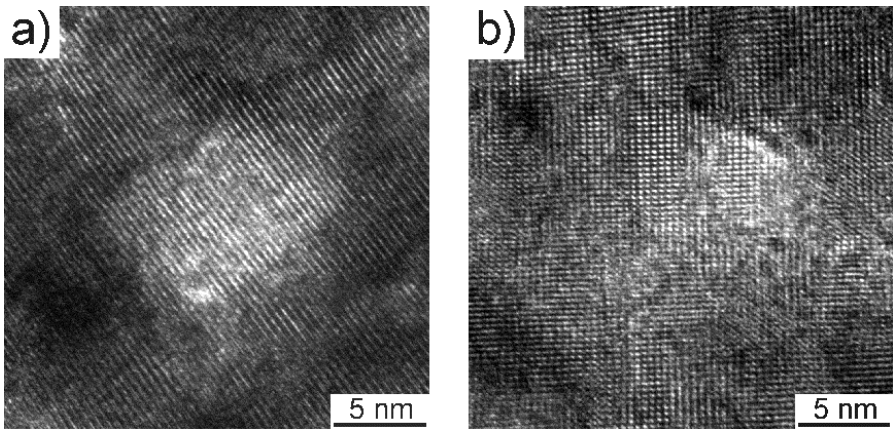
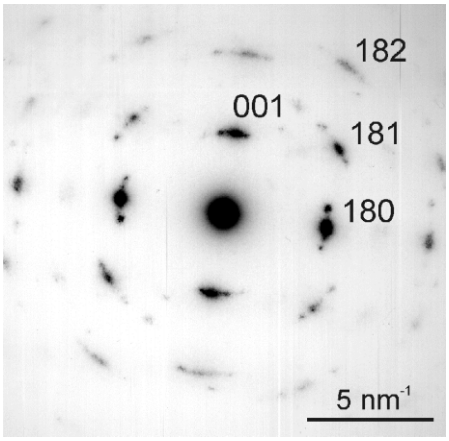
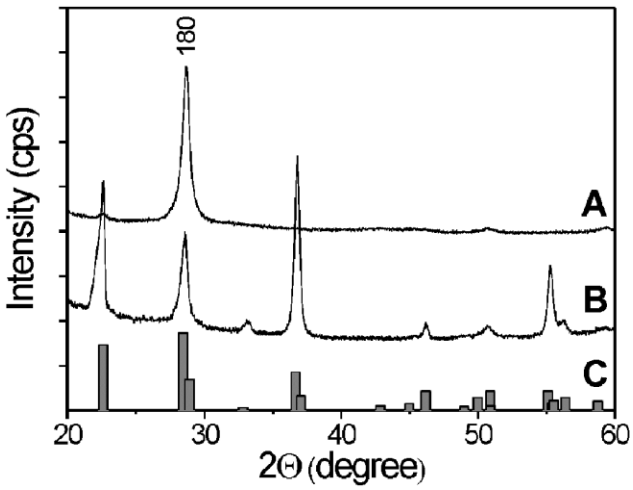
Supporting Information:



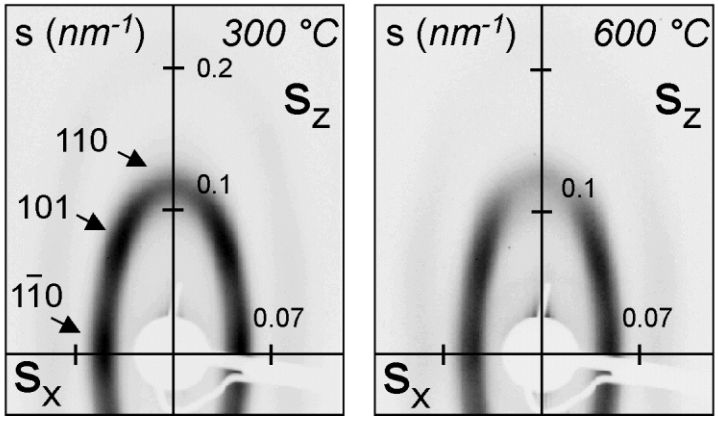
Supplementary Figure 1. High-resolution transmission electron microscopy images of a 23 nm side-length part of the mesostructure of a mesoporous, crystalline Nb_2O_5 film, demonstrating that the mesopores are surrounded by nanocrystals, which are crystallographically oriented in the same direction. Also, it is seen that the alignment of the metal oxide nanocrystals leads to a deformation of the mesopores into an angular shape.



Supplementary Figure 2. Selected area electron diffraction of mesoporous, crystalline Nb_2O_5 film, heat-treated at 600 °C. The diffraction pattern is identical to that shown in Figure 3b. Here, a different indexation is shown to illustrate that two crystallographic interpretations are possible. In comparison to Figure 3b, in this case an orientation perpendicular to the [180] is assumed and indexed accordingly. The reason for the ambiguity in the interpretation is the fact that the preparation of such films for electron microscopy does not allow to orient the specimen in exactly the same way as on the original substrates: usually small pieces are scratched off the film, and the small, flat flakes of metal oxide film orient preferentially parallel to the grid, but usually not exactly in the same way as during the nucleation on the original substrate.



Supplementary Figure 3. X-ray diffraction patterns of a mesoporous, crystalline Nb_2O_5 film (A), a corresponding film prepared without any surfactant (B) and the reference from the JCPDS database.



Supplementary Figure 4. 2D small-angle X-ray scattering patterns of a mesostructured Nb_2O_5 film as a function of the heat-treatment. The indexation is in conformity with a distorted bcc structure in [110] orientation.