Electronic Supplementary Information: Pressure-dependent topographic evolutions of cold-sintered zinc oxide surfaces

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Abstract

By applying atomic force microscope to the flat in-plane polycrystalline microstructure, pressure-dependent topographic evolutions can be studied with respect to surface dihedral angle and groove geometry. Using cold-sintered zinc oxide densified at 200°C as a model system, this study demonstrates an experimental methodology for quantification of relative grain boundary energetics in cold-sintered materials system and an associated geometric model for connecting the morphological change and underlying mechanochemical phenomenon under various uniaxial pressures ranging from 70 to 475 MPa. Depending on the applied pressure, anisotropic grain growth, normal grain growth, and coarsening are distinctively observed according to the changes in the groove geometry, suggesting that the growth kinetics is can be considered as a function of pressure.

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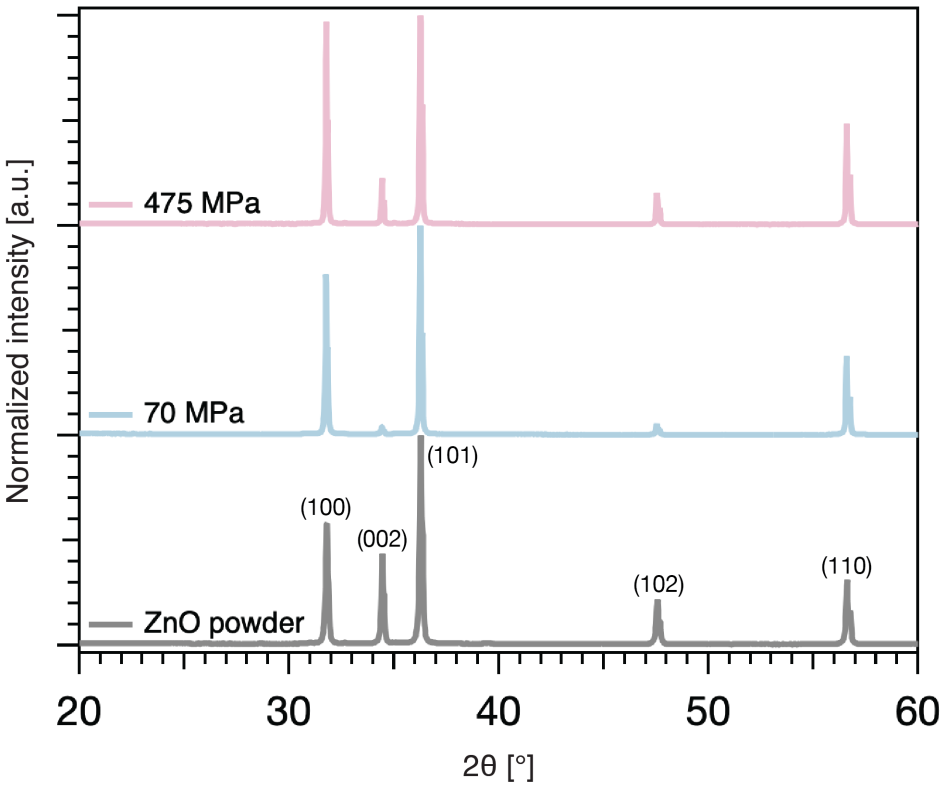

Figure S1: X-ray diffraction of ZnO powder, cold-sintered under 70 and 475 MPa.