Deformation of polycrystalline Ca-Perovskite up to 50 GPa

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Constraining the rheological properties of deep Earth phases is crucial for understanding mantle convection and its relation to seismic anisotropy. To that extend, material having the perovskite structure are particularly important with silicate and calcium perovskites accounting for about 70% and 5% of the lower mantle, respectively. In this study, we perform uniaxial deformation experiment of polycrystalline Ca-perovskite up 50 GPa in the diamond anvil cell. The state of stress and lattice preferred orientations within the sample were followed using radial diffraction techniques on the BL-10 beamline in Spring8. From the variations of the d-spacings with the diffraction angle, we deduce informations on the elastic properties and the non-hydrostatic stress in the sample. The variation of the intensities of the diffracted peaks along the Debye-Sheme rings provides informations on the orientations of the crystals composing the polycrystal. These results provide new valuable constrains for modeling and understanding anisotropic properties in the deep mantle.