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**Deformation of water ice VI: a single-crystal X-ray diffraction study**

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High-pressure polymorphs of water ice form significant portion of outer space icy satellites that are of particular interest to planetary science. Different processes of accretion, differentiation and early evolution followed by each satellite are governed by the elastic and rheological properties of the constituent materials. In order to obtain accurate mechanical data on ice VI and VII, we adopted a novel approach which makes use of single-crystal X-ray diffraction (SCXRD) for obtaining insight in the deformation mechanism of these high-pressure ices.

Two single crystals of ice VI have been grown *in situ* inside a diamond anvil cell at 1.2 GPa and at room temperature. Selected reflection profiles were measured repeatedly over 200 hours in order to monitor the variation of their broadening (due to the uniaxial stress and to the boundary between the two crystals) with time. We observed at these conditions elastic deformation for one of the crystals but a plastic response for the other. Here we report on results of line profile analysis and address the possible mechanism of ice VI single crystal deformation.

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