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【163】 Ice XIX: The second hydrogen-ordered polymorph related to ice VI

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We describe the discovery of ice XIX based on neutron diffraction, Raman spectroscopy, calorimetry and dielectric spectroscopy and study transitions in its hydrogen sublattice. The high-pressure ice polymorph crystallises in a $\sqrt{2} \times \sqrt{2} \times 1$ supercell with respect to the parent ice VI phase in space group P-4, where the water molecules are partially antiferroelectrically ordered. At ambient pressure, ice XIX experiences the first order-order transition known in ice physics to its sibling ice XV. This represents the first case for an oxygen atom lattice in which two types of hydrogen order are experimentally realised.

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