

Abstract Submitted
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QNS study on superprotonic conductor YUTAKA IKEDO, Toyota CRDL, HIROSHI NOZAKI, MASAHIKO HARADA, JUN SUGIYAMA, TAKU SATO, YASUMITSU MATSUO, YIMING QIU, JOHN COPLEY — Cesium hydrogen selenate, CsHSeO₄, and related materials *MHXO*₄, where *M* = Cs, Rb, K and *X* = S, Se, are considered to be a promising candidate as electrolyte materials for fuel cells. In order to clarify the mechanism of their high proton conductivity, quasielastic neutron scattering (QNS) measurements were carried out using single crystal samples of CsHSeO₄ on disk chopper spectrometer (DCS) in NIST Center for Neutron Research at temperatures mainly above T_C (= 401 K), at which CsHSeO₄ undergoes a structural phase transition from a low-T orthorhombic phase (Phase II) to a high-T tetragonal phase (Phase I). High proton conductivity, i.e., super-protonic ionic conductivity is observed only in Phase I. The analysis of the QNS spectrum suggests an anisotropic proton diffusion in Phase I, in spite of the isotropic behavior reported by AC conductivity measurements. The present QNS result thus provides crucial information on the proton diffusion pass in these materials.

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