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Diffuse scattering and low-energy phonons in superionic conductor $Cu_{1.8S}Se$ SERGEY DANILKIN, Bragg Institute, ANSTO, ANDREAS HOSER, Institute for Crystallography, RWTH Aachen, Germany, WERNER SCHWEIKA, Institute of Solid State Research, Forschungszentrum Jülich, Germany — The neutron diffuse and inelastic scattering were studied in the superionic α-phase of copper selenide. In neutron diffraction experiments on $Cu_{1.85}Se$ single crystal the diffuse scattering features were observed along [111] direction in vicinity of (400) and (422) reflections. In inelastic neutron scattering measurements performed with time-of-flight spectrometer the elastic and inelastic scattering processes were separated and a strong inelastic scattering was observed also along [111] nearby (400) and (022). This shows that diffuse scattering found in conventional diffraction experiment is mainly inelastic and most probably comes from the low-energy phonons. Such phonons with optic-like behaviour of transverse acoustic modes at $q/q_m > 0.2$-0.4 were found earlier in α-$Cu_{1.85}Se$ [1]. [1] S.A. Danilkin, A.N. Skomorokhov, A. Hoser, H. Fuess, V. Rajevac, N.N. Bickulova, Crystal structure and lattice dynamics of superionic copper selenide $Cu_{2-\delta}Se$, J. Alloys and Compounds, 2003, v. 361, p. 57-61.

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