Two Low-Energy Excitations in Superionic Conductor $RbAg_4I_5$

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AgI is well known as a superionic conductor. In the superionic α-phase above 147˚C, Ag ions migrate through the b.c.c. lattice formed by I ions. The stoichiometric compounds MAg_4I_5 (M = K, Rb) also show the Ag conduction, and then I ions form the β-Mn type sublattice [1]. In particular, $RbAg_4I_5$ has high-ionic-conducting phases in the wide temperature range from -157 to 228˚C [2]. The ionic conductivity for $RbAg_4I_5$ is about three times as high as that for KAg_4I_5 at the same temperature. It is proposed that the ionic radius of Rb is larger than that of K and the resultant expansion of the lattice makes Ag diffusion through any bottlenecks within the anion sublattice easier [3]. In this study, the inelastic neutron scattering spectra for $RbAg_4I_5$ and KAg_4I_5 were measured at the BL14 (AMATERAS : Cold–Neutron Disc–Chopper Spectrometer) in J-PARC [4]. Two low-energy excitations of $RbAg_4I_5$ observed at around E = 1.5 and 2.5 meV as shown in Fig. 1 will be discussed in the presentation.

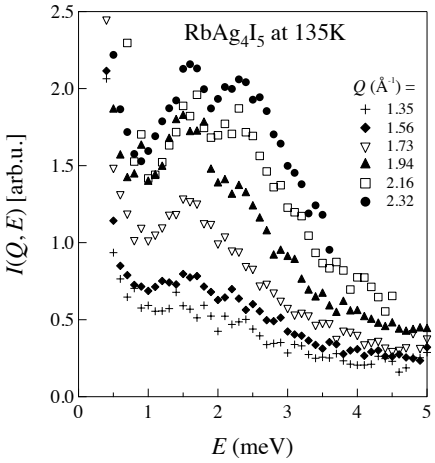

Fig. 1. Energy dependence of inelastic neutron scattering intensity, $I(Q, E)$, for polycrystalline $RbAg_4I_5$ at 135K sliced at several Q points.

References

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