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Anion motions in lithium amide-borohydride

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To cover the energy supply with renewable energies is a challenge of local and temporal distribution of renewable sources that requires energy storage technologies. Complex hydrides, which contain ions such as BH4- and NH2-, have a high hydrogen capacity and therefore are candidates for solid state hydrogen storage materials. Many studies reported the improvement of hydrogen reaction in complex hydrides as mixed systems with complex hydrides and/or metal hydrides and by using salt additives.
Li4BH4(NH2)3 contains 11.1 wt.% hydrogen, but it is very stable with the desorption temperature being above 573 K. Nevertheless, in the 6Mg(NH2)2+9LiH+LiBH4 system Li4BH4(NH2)3 is one desorption product, which is liquid under the reaction conditions. As liquid phase beyond solid phases it is supposed to accelerate the mass transport between the reactants and the reaction kinetics. To understand the chemical behaviour and atomic motions of Li4BH4(NH2)3, we measured the anion motions with quasielastic neutron scattering (QENS). We analysed the rotational and long range motions in dependence of temperature and assigned them to BH4- and NH2- using the deuteration technique.

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