

Proton mobility in tetra-*n*-butylammonium bromide semi-clathrate hydrate and conductivity measurements

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Nonionic clathrate hydrates are stabilized by van der Waals interaction between guest molecules and the host framework. In contrast, ionic clathrate hydrates are generated by an ionic interaction between an ionic guest and a surrounding host water framework, which quite differs from nonionic clathrate hydrates.

Tetra-*n*-butyl ammonium bromide (TBAB) hydrate, one kind of ionic clathrate hydrates, forms two types of semiclathrate hydrate according to its hydration number. At atmospheric pressure, the melting points are between room temperature and freezing point of water. There are some useful applications of the semiclathrate, for example using as a heat transport medium and gas separator, but there are little knowledge about electrochemical properties of TBAB hydrates.

In this work, <sup>2</sup>H NMR spectra and conductivity of TBAB hydrates have been obtained over the temperature range of 183–253 K. The presence of isotropic spectra above 183 K indicates that the deuterons (protons) are relatively mobile even below the melting temperature of TBAB.