Erstmalige Charakterisierung der Ammoniak-Proton-Komplexe $[(NH_3)_3H]^+$ und $[(NH_3)_4H]^+$ in den Kristallstrukturen von $(NH_4)_3AsS_4 \cdot 5\ NH_3$ und $(NH_4)_3SbS_4 \cdot 8\ NH_3$

First Characterization of the Ammonia-Proton-Complexes $[(NH_3)_3H]^+$ and $[(NH_3)_4H]^+$ in the Crystal Structures of $(NH_4)_3AsS_4 \cdot 5\ NH_3$ and $(NH_4)_3SbS_4 \cdot 8\ NH_3$

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The compounds $(NH_4)_3AsS_4 \cdot 5\ NH_3$ (**1**) and $(NH_4)_3SbS_4 \cdot 8\ NH_3$ (**2**) were prepared by the reaction of Na_3AsS_4 and Na_3SbS_4 with a proton-charged ion exchange material in liquid ammonia and characterized by low temperature single crystal X-ray structure analysis. The ammonium-ammoniates show H_3N-H$\cdots$N-hydrogen bonds between the ammonium ion and ammonia molecules ranging from 1.86 to 2.55 Å (DHA-angles: 145 – 173°) and H_3N-H$\cdots$S-bonds to the thioanions between 2.36 and 2.97 Å (DHA-angles: 130 – 176°). The former of the interactions are responsible for the formation of $[(NH_3)_2H]^+$, $[(NH_3)_3H]^+$ and $[(NH_3)_4H]^+$-complexes, the last two of which were characterized by X-ray analysis for the first time.

Key words: Liquid Ammonia, Hydrogen Bonding, Low-Temperature Crystal Structure Analysis, Ammonium Ion, Solvate Crystal