PREPARATION, STRUCTURE AND THERMAL DECOMPOSITION OF CHOLINIUM HEXAFLUOROTITANATE, CHOLINIUM HEXAFLUOROZIRCONATE AND THEIR MONOHYDRATES

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The cholinium hexafluorotitanate and cholinium hexafluorozirconate and their monohydrates were synthesized in aqueous solution by addition of the corresponding ammonium fluorometallates to the HF neutralized $[N(CH_3)_3C_2H_4OH]OH$. The preparation of crystalline compounds succeeded by a stepwise dehydration with ethanol. All compounds are fully characterized. Both the monohydrates and the dehydrates crystallize isotypically. The crystal structure analysis of the cholinium hexafluorotitanate monohydrate was solved. Crystal data: $(C_5H_{14}NO)_2TiF_6 \cdot H_2O$, M: 388,23, orthorhombic, $Pna2_1$, a=2547.1(7), b=960.6(4), c=726.9(4) pm, v=177850 pm^3, Z=4, D_c=1.330 g/cm^3. Causing by hydrolysis the thermal decomposition of the cholinium hexafluorometallates leads to the formation of TiO_2 or ZrO_2, respectively.
The figure shows the hydrogen bond system of $(C_5H_{14}NO)_2TiF_6 \cdot H_2O$: