Abstract

Aim of this thesis was the synthesis and characterization of new polyiodide anions with complexes of crown-ether and transition-metal. The resulted structural diversity of these crown-ether cations is fascinating: Solvent molecules serve to complete the coordination sphere of transition metal cations if the used crown-ether cannot do this. This can be observed for example in $[Mn(H_2O)_2(18c6)_2](I_7)_2$ and $[Ni(H_2O)_6(db18c6)_3](I_3)(I_5)(CHCl_3)$: In $[Mn(H_2O)_2(18c6)_2](I_7)_2$ the cation is coordinated by two crown-ether and two water molecules. The compound $[Ni(H_2O)_6(db18c6)_3](I_3)(I_5)(CHCl_3)$ has a cationic hexaaqua-complex which is surrounded by three polyether molecules due to hydrogen bonding of the *Jeffrey* building scheme. New triiodide, pentaiodide, heptaiodide, decaiodide and dodecaiodide anions were obtained as the compounds $[Zn(H_2O)_3(15c5)_2](I_3)_2$, $[Mn(H_2O)_2(18c6)_2](I_7)_2$, $[Zn(H_2O)_3(b18c6)](I_5)_2(H_2O)(b18c6)$, $[M(12c4)_2]I_{10}$ (M = Ca, Mn) and $[M(H_2O)_6(db24c8)_2]I_{12}(C_2H_5OH)(H_2)$ (M = Ni, Zn) shows. The iodine-rich compounds $[Fe(H_2O)_3(b18c6)]_4(I_8)(I_5)_4(I_3)_2(I_2)_2(B18K6)_8(H_2O)_8(THF)_2$ and $[Fe(H_2O)_3(b18c6)]_2(I_7)_2(I_5)_2(b18c6)_3(H_2O)_3$ are described for the first time. Furthermore, the mixed anionic compound $[Mn(H_2O)_4(db21c7)_2]_2(I_5)_2(I_3)(I_2)(I)(C_2H_5OH)_4$ could be synthesized, structurally characterized and be investigated spectroscopically. Elemental analysis, powder diffraction patterns and Raman spectra of selected compounds could be obtained.