Three New Coordination Compounds with Complex Cations \([M(X)_6]^{n+}\) (\(M = \text{Co: } X = \text{H}_2\text{O}, \text{NH}_3\) and \(n = 3\); \(M = \text{Ni: } X = \text{H}_2\text{O und } n = 2\)) and Hydrogenacetylenedicarboxylate Anions

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From an aqueous solution containing acetylenedicarboxylic acid (H_2ADC) and [Co(NH_3)_6]Cl_3 or Ni(O_2CCH_3)_2 \cdot 4H_2O single crystals of [Co(H_2O)_6][(ADC)(HADC)] \cdot 2H_2O (1), [Co(NH_3)_6]-[Cl_2(HADC)] \cdot H_2O (2) and [Ni(H_2O)_6](HADC)_2 \cdot 2H_2O (3) precipitated upon slow evaporation of the solvent. In their crystal structures slightly distorted octahedral coordination spheres of the metal ions ([Co(H_2O)_6]^3+, [Co(NH_3)_6]^3+ and [Ni(H_2O)_6]^2+) are found. These complex cations are further connected via weak hydrogen bonds to structural units of higher dimensionality. All compounds contain mono-protonated acetylenedicarboxylate anions (HADC\(^{-}\)). In 1 strong hydrogen bonds (O \(\cdots\) O = 2.524(5) Å) form ADC \(\cdots\) HADC\(^{-}\) dimers, whereas in 2 (H_2O \(\cdots\) HADC\(^{-}\))\(_{\text{oo}}\) ribbons (O \(\cdots\) O = 2.496(4) Å and 2.676(3) Å, respectively) and in 3 (HADC\(^{-}\))\(_{\text{oo}}\) chains (O \(\cdots\) O = 2.489(3) Å) are found. 1 and 2 represent new structure types, whereas 3 is isotypic to the known Mg and Zn compounds.

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