New coordination modes in potassium edta salts: $K_2[H_2edta]\cdot 2H_2O$, $K_3[Hedta]\cdot 2H_2O$ and $K_4[edta]\cdot 3.92H_2O$.

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Streszczenie

Three potassium edta (edta is ethylenediaminetetraacetic acid, H(4)Y) salts which have different degrees of ionization of the edta anion, namely dipotassium 2-({2-[bis(carboxylatomethyl)azaniumyl]ethyl} (carboxylatomethyl)azaniumyl)acetate dihydrate, 2K(+)·C(10)H(14)N(2)O(8)(2-)·2H(2)O, (I), tripotassium 2,2'-({2-[bis(carboxylatomethyl)amino]ethyl}ammonio)diacetate dihydrate, 3K(+)·C(10)H(13)N(2)O(8)(3-)·2H(2)O, (II), and tetrapotassium 2,2',2'',2'''-(ethane-1,2-diyldinitrilo)tetraacetate 3.92-hydrate, 4K(+)·C(10)H(12)N(2)O(8)(4-)·3.92H(2)O, (III), were obtained in crystalline form from water solutions after mixing edta with potassium hydroxide in different molar ratios. In (II), a new mode of coordination of the edta anion to the metal is observed. The HY(3-) anion contains one deprotonated N atom coordinated to K(+) and the second N atom is involved in intramolecular bifurcated N-H···O and N-H···N hydrogen bonds. The overall conformation of the HY(3-) anions is very similar to that of the Y(4-) anions in (III), although a slightly different spatial arrangement of the -CH(2)COO(-) groups in relation to (III) is observed, whereas the H(2)Y(2-) anions in (I) adopt a distinctly different geometry. The preferred synclinal conformation of the -NCH(2)CH(2)N- moiety was found for all edta anions. In all three crystals, the anions and water molecules are arranged in three-dimensional networks linked via O-H···O and C-H···O [and N-H···O in (I) and (II)] hydrogen bonds. K···O interactions also contribute to the three-dimensional polymeric architecture of the salts.

Adres publiczny

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