Highly Symmetrical Hydrogen-bonded Networks

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Metal/ligand covalent bonds and hydrogen bonds are the two major types of interactions that supramolecular chemists exploit to engineer both finite and infinite networks, for possible use in functional materials. The guanidiunium cation, $[C(NH_2)_3]^+$, has exerted powerful structure-determining effects on numerous coordination and hydrogen-bonding networks. The 3 pairs of hydrogen-bonds of the trigonal cation are positioned perfectly to interact with a variety of oxyanions to act as a 3-connecting node, in this case to create two new families of 3-dimensional hydrogen-bonding networks of cubic symmetry. One family are of the composition, $XO_4[C(NH_2)_3][Me_4N]$, where X=S, Cr and Mo, and have the (10,3)-a net topology. The second family are of the composition $[B(OMe_3)_4]_3[C(NH_2]_3]_4^+X^-$.solvate, where X=Cl, PF_6, NO_3, BF_4, Br, and I, and crystallise with the borocite topology. Single crystal X-ray studies have been conducted to characterise all compounds.

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