Synthesis and Crystal Structure of the Novel Three-dimensional Vanadium Coordination Compound Potassium Oxo-bis(hydroxylamido)malonatovanadate(V)

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In the crystal structure of the title complex, $K_2[(VO)\_2(NH\_2O)\_4(C_3H_2O_4)_2] \cdot 3H_2O$, the V(V) centre is bound to a chelating malonate ligand, two bidentate hydroxylamido ligands and one oxo ligand, defining a pentagonal bipyramidal coordination (VO$_5$N$_2$). The potassium cations are found to adopt two types of coordination geometry with the malonate ligand, the bidentate hydroxylamido ligand and water molecules: the first one is hepta-coordinate in an irregular K(1)O$_7$ polyhedron, and the second one is octa-coordinate in an irregular K(2)O$_8$ polyhedron. The K(1)O$_7$/K(2)O$_8$ and VO$_5$N$_2$ polyhedra are closely linked by sharing faces to form K-V dinuclear units KVO$_9$N$_2$ and KVO$_{10}$N$_2$, respectively. The two close-packed units, KVO$_9$N$_2$ and KVO$_{10}$N$_2$, are connected by sharing edges to generate a tetrameric unit K$_2$V$_2$O$_{17}$N$_4$. Each of these units is joined to four neighbouring units by sharing corners, providing further propagation into a two-dimensional layer. Adjacent layers are connected via the carboxylic oxygen atoms of the malonate units to give a three-dimensional framework in the crystals.

Key words: Vanadium Compounds, Hydroxylamine, Insulin Mimics, Malonic Acid