

1-D and 2-D Uranium(VI) Coordination Polymers

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For this study we chose the reactions of uranyl nitrate with oxalic acid and 2,5-pyridine dicarboxylic acid. The resultant products were a 1-D polymer sesquihydrate $\{[\text{UO}_2(\text{C}_2\text{O}_4)(\text{CH}_3\text{OH})]1.5\text{H}_2\text{O}\}_n$ (**1**) and a 2-D polymer sheet $\{[\text{UO}_2(\text{C}_7\text{H}_3\text{NO}_4)(\text{CH}_3\text{OH})]0.5\text{CH}_2\text{Cl}_2\}_n$ (**2**) respectively. Both structures are based on the seven coordinate uranium(VI) ion centres.

The polymer chain in compound **1** is propagated by the oxalate groups acting as bridges between the adjacent metal centres. The packing of polymer strands forms a 3-dimensional interpenetrated network of channels running parallel to the three axes and which are filled with water molecules.

The polymeric compound **2** is based on the uranium(VI) ion centres coordinated to three 2,5-pyridine dicarboxylates, two oxo groups and one methanol molecule. The structure consists of stacked layers of polymer sheets separated by dichloromethane guest molecules.

Both **1** and **2** are very stable in air. We have dried samples of these complexes that have been standing in the air for over six months with no loss of integrity (checked and confirmed by X-ray powder diffraction). Complex **2** is also very stable in mother liquor while crystals of **1**, if left in mother liquor, undergo a transformation over a period of 3-4 weeks. There is a replacement of coordinated MeOH with water and an inclusion of an extra half water molecule.

Keywords: uranyl complexes, oxalate, 2,5-pyridine dicarboxylate