

Uranyl Selenates: From Finite Clusters to Nanotubules

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Structural chemistry of uranyl selenates with over than 50 compounds first characterized by the authors is described on the basis of graph theory adapted to the description of heteropolyhedral structures [1]. Structural motifs in uranyl selenates are based upon corner-sharing UO_7 bentagonal bipyramids and SeO_4 tetrahedra. Structural diversity of these motifs range from finite clusters and chains to complex sheets and nanotubules [2, 3]. It is shown that most of the 0-D, 1-D and 2-D graphs corresponding to the uranyl selenate motifs can be considered as derivatives of highly regular {3.6.3.6} graph consisting of 3-connected white and 6-connected black vertices. Structural and geometrical isomerism induced by tetrahedra orientation and selective hydration of UO_7 polyhedra will be described. The model of nanotubule formation in uranyl selenate systems based upon the rolling of 2-D sheets is discussed. Self-assembly of organic amines governing by competitive hydrophobic/hydrophilic interactions and structure of organic/inorganic interfaces in uranyl selenates will be discussed.

[1] Krivovichev S.V., *Crystallogr. Rev.*, 2004, **10**, 185. [2] Krivovichev S.V., Kahlenberg V., Kaindl R., Mersdorf E., Tananaev I.G., Myasoedov B.F., *Angew. Chem. Int. Ed.*, 2005, **44**, 1134. [3] Krivovichev S.V., Kahlenberg V., Tananaev I.G., Kaindl R., Mersdorf E., Myasoedov B.F. J., *Amer. Chem. Soc.*, 2005, **127**, 1072.

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