

# Structural Topologies of Uranyl Nanoclusters

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## Summary

This presentation will focus on the topological aspects of clusters of uranyl polyhedra in the 1 to 3 nanometer (diameter) range. Uranyl polyhedra self-assemble in alkaline solutions containing peroxide to form about 15 topologically unique clusters of uranyl polyhedra containing as many as 60 U atoms. Under appropriate conditions, an additional 15 clusters can be made utilizing rings of four, five or six uranyl peroxide polyhedra linked through pyrophosphate and/or oxalate ligands. Most of the clusters we have created consist of some combination of topological squares, pentagons and hexagons. Those containing only pentagons and hexagons are classic fullerene topologies. In the case of uranyl polyhedra, the fullerene topology with the maximum symmetry is favored over those that minimize the number of pentagonal adjacencies (contrary to C-based fullerenes).