Open-framework Germanates by Organic Templating

Xiaodong Zou, Liqiu Tang, Yafeng Li, Tony Conradsson, *Structural Chemistry, Stockholm University, SE-106 91 Stockholm, Sweden.* E-mail: zou@struc.su.se

Templated germanates have recently drawn great interests due to their remarkably abundant crystal chemistry. The structure diversity of germanates is associated with the ability of germanium to form oxygen polyhedra with four, five and six coordinations.

Recently, a number of new zeolite topologies was discovered in germanates and silicogermanates (ASV, IWR, IWW, UOZ). The major impact of incorporating germanium into zeolite structures is that the T-O-T angles can be much smaller for Ge (~130°) than for Si (~145°). The smaller T-O-T angles are needed for framework structures with 3- and 4-rings, and thus very open frameworks with low framework densities.

We present several germanates with novel zeolite topologies, including a pure germanate FOS-5 (BEC) and a borogermanate SU-16[1] (SOS). The building units are double 4-rings (D4R) in FOS-5 and two edge-sharing 3-rings (B_2Ge) in SU-16.

We also summarize several novel germanates and silicogermanates with extra-large rings, formed by one or two types of clusters. Two of them are SU-12 [2] and SU-14. Both SU-12 and SU-14 are built from the same $(Ge, Si)_7$ clusters and contain 24-ring channels. Due to the different connections of the $(Ge, Si)_7$ clusters, the 3D structures of SU-12 and SU-14 are different, and as well as their 3D intersecting channels.

[1] Li Y.F., Zou X.D., *Angew. Chem. Int. Ed*., 2005, **44**, *early view*. [2] Tang L.Q., Dadachov M.S., Zou X.D., *Chem. Mater.,* 2005, *in press.*

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