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New open-framework germanates with different types of inorganic molecular clusters

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A series of open-framework germanates synthesized at Stockholm University, denoted as SU-n, will be presented. They include pure germanates as SU-44, the recently published crystalline SU-M [1] and an aluminogermanate SU-46.
All these germanates were prepared by hydrothermal synthesis from a solution consisting of germanium dioxide and an organic amine as template, using water as solvent. In most cases hydrofluoric acid was added as a mineralizer. The resulting solution was transferred to a teflon-lined autoclave and heated to temperatures between 160-170°C for one or two weeks.
Single crystal X-ray diffraction data for both SU-M and SU-46 were collected at 100 K using graphite-monochromatized Mo K_α radiation. For needle-like crystals of SU-44, single crystal X-ray diffraction data were collected at 293 K using a synchrotron radiation at the beamline I711, Max-lab, Lund, Sweden. The structure solution and refinement were carried out using the interface WinGX [2] with the software SHELX-97.
SU-46 is a three-dimensional structure with a new zeolite topology. It contains 2D intersecting 8-ring channels. Due to a tendency for twinning it has been difficult to determine the space group, apply absorption correction and find template positions.
SU-M is built from a single type of cluster $Ge_{10}O_{24}(F,OH)_3$ (denoted Ge_{10}). The clusters are connected in such a way that they lie on a gyroidal minimal surface with fully ordered crystalline walls [1].
When the temperature for the synthesis of SU-M is raised, SU-44 was then synthesized. Instead of the Ge_{10}-clusters in SU-M, SU-44 contains two different clusters, $Ge_7O_{17}(F,OH)_2$ (denoted Ge_7) and $Ge_9O_{22}(F,OH)_4$ (denoted Ge_9). Two different clusters in the same germanate structure has not previously been reported in the literature.
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Novel propeller-like phosphorus containing compounds

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Molecular and crystal structures of novel propeller-like phosphorus containing compounds have been studied by X-Ray analysis. The molecule of 1-phenyl-3,3,10,10-tetrakis(triphenyl)-6,7-benzo-1-phospha-2,3,8,9-tetraoxa-tricyclo[3,3,0,2]-dec-6-ene is a first molecule of such type. The angles between the vanes of propeller are approximately 60 degrees. Benzene ring, bounded to phosphorus atom, is deviated from axis of propeller on 8 degrees. It is perpendicular to unsaturated cycle. In crystal of this compound there are no classical hydrogen bonds. But short contacts of F..F-type and O..F-type result in formation of cylindrical supramolecular ensembles with "fluorine channels" along *0*b axe. The crystal packing is stabilized by π-π-interactions between aromatic ring of tricyclic system. The packing coefficient and solvent accessible potential area in crystal were also analyzed.
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