3D “mot” (4, 4)-c two nodal nets. The interpenetration vector is [0, 1, 0], Class Ia.

The metal organic nets are constructed from a tetrameric unit and single octahedra linked through the Bpa ligand. The tetrameric unit consists of an edge shared octahedra forming a dimeric unit linked to single octahedra through two Bpa ligands in “Gauche” conformation. Each tetrameric unit is linked to four octahedra via trans-Bpa ligands. This connectivity generates a three dimensional 2 nodal (4,4) connected net with \(6^2 \cdot 8 \cdot 12 \cdot (6^3)\) point symbol.

The vanadium oxide subunit consists of twelve corner linked VO\(_4\) tetrahedra, giving rise to isolated V\(_{12}\)O\(_{36}\) centrosymmetric cycles. The dimmers of the tetrameric units lie inside the V\(_{12}\)O\(_{36}\) cycle and the octahedra acts as a linker between the vanadium oxide subunit. This way, the V\(_{12}\)O\(_{36}\) cycle of one

X-ray powder diffraction shows a mixture of two phases: One is the NaGaGeO\(_4\) starting material, the other is a typical sodalite phase, which can be indexed in space group P-43n with lattice parameter \(a = 8.995 \ \text{Å}\). The IR-absorption spectra show typical bands of H\(_2\)O at 1665 cm\(^{-1}\) as well as typical bands of OH\(^-\) from the B(OH)\(_4\)\(^-\) group at 3568 cm\(^{-1}\) in good agreement with Pietsch et al. [2]. Furthermore, the presence of the enclathered B(OH)\(_4\)^- species is confirmed by arising bands in the TDIR-spectra, since B(OH)\(_4\)^- reacts to BO\(_2\)OH\(^-\) at approx. 473 K and subsequently to BO\(^-\) at approx. 873 K by dehydration with increasing temperatures as described by Pietsch et al. [2]. The SEM-investigations show the presence of two different morphologies within the reaction product. As shown in the SEM-images, there are crystallites with rhombic dodecahedral as well as cubic morphology. EDX-analysis shows that the crystallites with cubic morphology tend to have higher Ga/Ge-ratios (average: 1.02) than the crystallites with rhombic dodecahedral morphology (average: 0.86).

Further investigations will aim at controlling the morphology by variation of synthesis parameters and subsequent structural specifications of the two different morphologies as well as studying the behavior of the cage-filling anions.


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Keywords: Vanadates, third generation materials, self-catenation

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Synthesis and characterization of B(OH)\(_4\)-H\(_2\)O enclathered gallogermanate sodalite J. Poltz\(^{2}\), L. Robben\(^{1}\), J.- Ch. Buhl\(^{1}\), "Institut für Mineralogie, Leibniz Universität Hannover, Germany E-mail: j.buhl@mineralogie.uni-hannover.de

Tetrahydroxoborate and water enclathered sodalite with a gallogermanate host framework was prepared by means of hydrothermal synthesis and characterized by X-ray powder diffraction, IR-spectroscopy, temperature-dependent IR-(TDIR) spectroscopy as well as scanning electron microscopy (SEM) and energy dispersive X-ray (EDX)-analysis. The hydrothermal synthesis was performed under mild conditions (i.e. at 393 K) with the beryllonite analogous phase NaGaGeO\(_4\) as the source of Ga and Ge. Synthesis and crystal structure of the beryllonite type NaGaGeO\(_4\) are described in detail in [1]. The mild hydrothermal synthesis was carried out in a Tetlon coated steel autoclave filled with layers of 1 g of NaBH\(_4\)-granulate and 1 g of pulverized NaGaGeO\(_4\), before 5 ml 1 M sodium hydroxide solution was added. After a reaction time of 24 h the sample was washed with deionized water and dried at 353 K for 12 h.

X-ray powder diffraction shows a mixture of two phases: One is the NaGaGeO\(_4\) starting material, the other is a typical sodalite phase, which can be indexed in space group P-43n with lattice parameter \(a = 8.995 \ \text{Å}\). The IR-absorption spectra show typical bands of H\(_2\)O at 1665 cm\(^{-1}\) as well as typical bands of OH\(^-\) from the B(OH)\(_4\)\(^-\) group at 3568 cm\(^{-1}\) in good agreement with Pietsch et al. [2]. Furthermore, the presence of the enclathered B(OH)\(_4\)\(^-\) species is confirmed by arising bands in the TDIR-spectra, since B(OH)\(_4\)\(^-\) reacts to BO\(_2\)OH\(^-\) at approx. 473 K and subsequently to BO\(^-\) at approx. 873 K by dehydration with increasing temperatures as described by Pietsch et al. [2]. The SEM-investigations show the presence of two different morphologies within the reaction product. As shown in the SEM-images, there are crystallites with rhombic dodecahedral as well as cubic morphology. EDX-analysis shows that the crystallites with cubic morphology tend to have higher Ga/Ge-ratios (average: 1.02) than the crystallites with rhombic dodecahedral morphology (average: 0.86).

Further investigations will aim at controlling the morphology by variation of synthesis parameters and subsequent structural specifications of the two different morphologies as well as studying the behavior of the cage-filling anions.


Keywords: sodalites, synthesis, germinates

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Robust Alkaline-earth arenedisulfonate Metal-Organic Frameworks materials, Ana E. Platero-Prats, Natalia Snejko, Ángeles Monge, Enrique Gutiérrez-Puebla, Instituto de Ciencia de Materiales de Madrid (ICMM-CSIC). E-mail: aplatero@icmm.csic.es
Metal-organic Frameworks (MOFs) have been recognized for their great potential to act as crystalline functional solid state materials with interesting structural properties and promising applications, such as carbon dioxide sequestration and drug delivery [1]. In this area, thanks to the use of arenedisulfonate ligands, which can provide multiple coordination sites, stable frameworks can be obtained with various dimensionalities [2]. We have been engaged for long time in the new MOFs using arenedisulfonate ligands like anthraquinone-2,6-disulfonate (2,6-AQDS, from now on). Our previous studies have shown the ability of this disulfonate ligand to coordinate with rare-earth elements, giving rise to the construction of catalytically active materials [3].

This work deals with the design of a new family of alkaline-earth MOFs based on 2,6-AQDS ligand, synthesized by hydrothermal route as pure phases. Thus, herein we report new four alkaline-earth materials showing different dimensionalities and networks, which have been characterized by means of single-crystal X-ray diffraction. Moreover, topological analysis of these materials has been also carried out.


Keywords: organic inorganic hybrid materials, hydrothermal synthesis, materials science