

valence chromates, $\text{NH}_4\text{Cr}(\text{CrO}_4)_2$ constitutes a new structure type. The first known compound containing the CrSO_7^{2-} anion is described.

The first rare-earth sulfate containing more than one alkali element structurally characterized is $\text{K}_5\text{Na}[\text{Ce}_2(\text{SO}_4)_6]$. Its structure consists of pairs of edge sharing cerium polyhedra, interlinked by edge and corner sharing sulfate groups, forming layers connected by potassium ions. Also the acidic $\text{K}_6[\text{Ce}(\text{HSO}_4)_2(\text{SO}_4)_4]\cdot\text{H}_2\text{O}$ is unique and constitutes a new structure type since it contains rare-earth monomers, $[\text{Ce}(\text{HSO}_4)(\text{SO}_4)_4]^{5-}$.

The existence of alterable oxidation states for the cerium ion may be a base for new attractive applications in the future. In the structure of $\text{K}_5\text{Ce}_2(\text{SO}_4)_6\cdot\text{H}_2\text{O}$, there are pairs of edge sharing cerium polyhedra with one delocalized f^1 electron. The cerium polyhedra are linked through edge and corner sharing sulfate bridges thereby forming layers joined by potassium ions. The oxidation state of each cerium ion is 3.5. The structure of $\text{CrCe}(\text{III})_7\text{Ce}(\text{IV})_6(\text{HSO}_4)_6(\text{SO}_4)_{21}\cdot 75\text{H}_2\text{O}$ differs significantly from previously known structures of mixed-valence cerium compounds. It extends to form layers through which there are large open channels, c.a 10 Å in diameter.

MS13 P10

Complex Structures of Simple Molybdates.

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Octamolybdates are the most numerous, important and interesting group of molybdates. They are thoroughly investigated due to their vast applications in catalysis. Octamolybdates are also promising materials for optoelectronic applications. In this report we describe three new octamolybdates. Even though the conditions of their syntheses were very similar and quite simple, different from each other compounds were obtained. All of them are organoammonium octamolybdates, but their structures differ significantly. In $\text{Mo}_8\text{O}_{26}\text{Ca}_4\text{N}_4\text{C}_{10}\text{H}_{22}$ **(1)**, coordination polymeric structure exists, octamolybdate anions are connected by Ca^{2+} cations and create straight chains surrounded by organic cations. $\text{Mo}_8\text{O}_{26}\cdot 2(\text{C}_6\text{H}_4(\text{NH}_2)_2)\cdot 4(\text{C}_6\text{H}_4(\text{NH}_2)_2)\cdot 4\text{H}_2\text{O}$ **(2)** belongs to the family of molybdates in which Mo^{+6} cation is directly bonded to N atoms. In $\text{Mo}_8\text{O}_{26}\cdot 4(\text{C}_{10}\text{H}_7\text{NH}_3)\cdot 4(\text{C}_{10}\text{H}_7\text{NH}_2)\cdot 4\text{H}_2\text{O}$ **(3)** $\text{Mo}_8\text{O}_{26}^{4-}$ anions are separated by double organic layers consisted of 2-ammoniumnaphthalene cations, 2-aminonaphthalene molecules and molecules of water. The thickness of the layers is about 18 Å.

All compounds were synthesised for the first time in our laboratory. In addition to crystal structure studies, they were also characterised by IR spectroscopy and DSC investigations.

Crystallographic data for the investigated compounds:

(1) formula: $\text{Mo}_8\text{O}_{26}\text{Ca}_4\text{N}_4\text{C}_{10}\text{H}_{22}$ **Ca**, a,b,c,α,β,γ=9.732(2) Å, 10.575(2), 11.686(2) Å, 65.34(2)°, 65.61(2)°, 86.88(2)°, V=985.2(3) Å³, SG, P-1 (2) Z=2.

(2) formula: $\text{Mo}_8\text{O}_{26}\cdot 2(\text{C}_6\text{H}_4(\text{NH}_2)_2)\cdot 4(\text{C}_6\text{H}_4(\text{NH}_2)_2)\cdot 4\text{H}_2\text{O}$, a,b,c,α,β,γ=8.441(4) Å, 12.121(4) Å, 14.646(5) Å,

87.834(4)°, 78.148(4)°, 84.454(4)°, V=1459.3 Å³, SG=P-1 (2), Z=1.

(3) formula: $\text{Mo}_8\text{O}_{26}\cdot 4(\text{C}_{10}\text{H}_7\text{NH}_3)\cdot 4(\text{C}_{10}\text{H}_7\text{NH}_2)\cdot 4\text{H}_2\text{O}$, a,b,c,α,β,γ= 10.184(5) Å, 10.592(5) Å, 22.737(7) Å, 78.675(5)°, 78.900(5)°, 65.427(5)°, V=2170.1 Å³, SG=P-1 (2), Z=1.

MS13 P11

Synthesis, crystal structures and properties of metal silicates Kwang-Hwa Lii, Department of Chemistry, National Central University, Chungli, Taiwan.
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Recently much work has focused on the synthesis of transition metal silicates because of their rich structural chemistry and interesting physical and chemical properties. Most of these compounds were synthesized with alkali metal cations under hydrothermal conditions at 180-240 °C. Our synthetic methods are 2-fold, namely high-temperature, high-pressure hydrothermal reactions at ca. 550-600 °C and 1000-2000 bars with alkali metal counter cations and molten flux reactions at high temperature. We have synthesized a large number of new silicates of transition metals, main group elements, lanthanides, and uranium. For example, we reported the synthesis of $\text{Rb}_4(\text{NbO})_2\text{Si}_8\text{O}_{21}$ and its solid-state NMR spectra. The ²⁹Si MAS NMR spectrum shows multiplet patterns which arise from ⁹³Nb(spⁱⁿ-9/2)-²⁹Si *J*-coupling. This is the first example of two-bond *J*-coupling between a quadrupolar nucleus and a spin-1/2 nucleus in the solid state. The structure $\text{Rb}_3\text{In}(\text{H}_2\text{O})\text{Si}_5\text{O}_{13}$ consists of 5-membered rings of corner-sharing SiO_4 tetrahedra connected *via* corner sharing to four adjacent 5-membered rings to form a 3D silicate framework which belongs to the CdSO_4 topological type. The first pentavalent-uranium silicate, $\text{K}(\text{UO})\text{Si}_2\text{O}_6$, has also been synthesized. In this presentation I will report the syntheses, crystal structures, solid-state NMR spectroscopy, and luminescence properties of a number of new metal silicates.

MS13 P12

2-D and 3-D structures of Luminescent Zinc Metal-Organic Frameworks. Tatiana V. Timofeeva^a, Christina A. Bauer,^b Mark D. Allendorf^b. ^aDepartment of Natural Sciences, New Mexico Highlands University, Las Vegas, NM 87701, USA; ^bSandia National Laboratories, Livermore, CA 94551, USA.
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Applications of metal-organic frameworks (MOFs) depend on their structural characteristics such as pores size and availability of absorption. The preparation and characterization of two zinc MOFs based on a flexible and emissive linker molecule, stilbene, is described. Reaction of *trans*-4,4'-stilbene dicarboxylic acid and zinc nitrate in *N,N*-dimethylformamide (DMF) yielded under different conditions in dense 2-D network, **1**, or porous 3-D framework structure, **2**. This framework consists of two interpenetrating cubic lattices, each featuring basic zinc carboxylate vertices joined by *trans*-stilbene. Fragment of one of such lattices is depicted below.