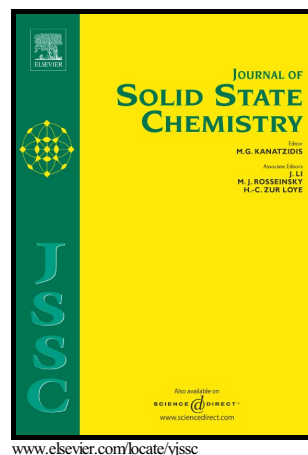


Strontium Manganese Vanadates from
Hydrothermal Brines: Synthesis and Structure of
 $\text{Sr}_2\text{Mn}_2(\text{V}_3\text{O}_{10})(\text{VO}_4)$, $\text{Sr}_3\text{Mn}(\text{V}_2\text{O}_7)_2$, and
 $\text{Sr}_2\text{Mn}(\text{VO}_4)_2(\text{OH})$

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Strontium Manganese Vanadates from Hydrothermal Brines: Synthesis and Structure of $\text{Sr}_2\text{Mn}_2(\text{V}_3\text{O}_{10})(\text{VO}_4)$, $\text{Sr}_3\text{Mn}(\text{V}_2\text{O}_7)_2$, and $\text{Sr}_2\text{Mn}(\text{VO}_4)_2(\text{OH})$.

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Abstract

Three new strontium manganese vanadates, $\text{Sr}_2\text{Mn}_2(\text{V}_3\text{O}_{10})(\text{VO}_4)$ (**I**), $\text{Sr}_3\text{Mn}(\text{V}_2\text{O}_7)_2$ (**II**), and $\text{Sr}_2\text{Mn}(\text{VO}_4)_2(\text{OH})$ (**III**), were prepared using a high temperature (580°C) hydrothermal method with various chloride salts as the mineralizer. Minor differences in the chloride stoichiometry led to significant differences in product. Compound **I** crystallizes in the monoclinic space group $P2_1/c$ ($a = 6.8773(12)$ Å, $b = 15.061(3)$ Å, $c = 11.609(2)$ Å, $\beta = 96.745(8)^\circ$), and consists of edge-shared octahedral manganese (II) dimers coordinated by trimeric $[\text{V}_3\text{O}_{10}]$ and monomeric $[\text{VO}_4]$ groups. Compound **II** crystallizes in the tetragonal crystal system, $P4_32_12$ ($a = 6.9951(2)$ Å, $c = 25.4390(7)$ Å), and is built from monomeric manganese (II) octahedra chelated by two pyrovanadate $[\text{V}_2\text{O}_7]$ groups and linked to each other by additional pyrovanadates to form layers. Compound **III** is a noncentrosymmetric variation on the brackebuschite structure type, crystallizing in the monoclinic space group $P2_1$ ($a = 7.6316(3)$ Å, $b = 6.1204(3)$ Å, $c = 8.6893(3)$ Å, $\beta = 111.3940(10)^\circ$). The structure is composed of octahedral manganese (III) edge-sharing chains coordinated to corner-sharing monomeric $[\text{VO}_4]$ groups, thereby forming a manganese vanadate chain. All compounds were characterized by single-crystal X-Ray diffraction, powder

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