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A bulky oxime for the synthesis of Mn(III) clusters.

Autorzy

Dimitris A. Kalofolias

Andreas G. Flamourakis

Miłosz Siczek

Tadeusz Lis

Constantinos J. Milios

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Streszczenie

The reaction between Mn(OAc)2·4H2O and Br-saoH2 (=5-Br-salicylaldoxime) in EtOH in the presence of NMe4OH led to the formation of the hexanuclear cluster [Mn6O2 (Br-sao) 6 (OAc) 2 (H2O) 2 (EtOH) 2]·2.8H2O·2.2EtOH (1). Switching from Mn(OAc) 2·4H2O to Mn(ClO4)2·6H2O, the same reaction upon addition of pivH (= trimethyl acetic acid) yielded [Mn6O2 (Br-sao) 6 (piv) 2 (H2O) 2 (EtOH) 2]·6EtOH (2 6EtOH), and finally upon changing pivH to NaO2CPh, we were able to isolate [Mn6Na2O2 (Br-sao) 6 (O2CPh) 4 (H2O) 2 (EtOH) 4]·6EtOH (3 6EtOH). Clusters 1 and 2 6EtOH describe "typical" [Mn6/oximate] complexes consisting of two {Mn3} oxo-centered triangular units bridged by oximate groups, while in 3 6EtOH these triangular motifs are separated by two sodium cations. An investigation into the magnetic properties of all three clusters revealed the presence of dominant antiferromagnetic interactions, leading to ground states of S = 4 and 2 for 1 and 3, respectively. Finally, cluster 2 6EtOH functions as a single-molecule magnet with Ueff = 27.54 K.

Słowa kluczowe

Mn(III) oximato complexes, Crystal structures, magnetic properties, single-molecule magnets

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