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A family of [$Mn^{III}_6Ln^{III}_2$] rod-like clusters.

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Streszczenie

Employment of LH3 (= 2-(β-naphthalideneamino)-2-hydroxymethyl-1-propanol) in mixed-metal manganese-lanthanide cluster chemistry has led to the isolation of five new octametallic heteronuclear isostructural [MnIII6LnIII2] complexes. More specifically, the reaction of Mn(ClO4)2.6H2O with LH3 and the corresponding lanthanide nitrate in MeCN in the presence of base, NEt3, yielded five complexes with the general formula [MnIII6LnIII2O2(OH)2(H2O)2(LH)6(NO3)6].6MeCN.0.5H2O (Ln: Gd, 1.6MeCN.0.5H2O; Tb, 2.6MeCN.0.5H2O; Dy, 3.6MeCN.0.5H2O; Er, 4.6MeCN.0.5H2O). Furthermore, the YIII analogue, [MnIII6YIII2O2(OH)2(H2O)2(LH)6(NO3)6].6MeCN.0.5H2O (5.6MeCN.0.5H2O), was also synthesized in the same manner. All five clusters describe a central rod-like topology consisting of four face-sharing defective cubane metallic units, forming a planar hexametallic [MnIII4LnIII2] core, which is further capped by two MnIII ions. Dc magnetic susceptibility studies in the 5 – 300 K range for complexes 1-5 reveal the presence of dominant antiferromagnetic exchange interactions within the metallic clusters, while ac magnetic susceptibility measurements show temperature and frequency dependent out-of-phase signals for the DyIII analogue (3.6MeCN.0.5H2O), suggesting potential single molecule magnetism character. Furthermore, the YIII analogue yielded a diamagnetic ground-state for the [MnIII6] core, thus proving that the SMM character displayed by 3.6MeCN.0.5H2O is due to the presence of the DyIII centres.

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