

2-aminoisobutyric acid in Co(II) and Co(II)/Ln(III) chemistry: homometallic and heterometallic clusters.

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The synthesis and magnetic properties of 13 new homo- and heterometallic Co(II) complexes containing the artificial amino acid 2-amino-isobutyric acid, aibH, are reported: $[\text{Co}^{\text{II}}_4(\text{aib})_3(\text{aibH})_3(\text{NO}_3)](\text{NO}_3)_4 \cdot 2.8\text{CH}_3\text{OH} \cdot 0.2\text{H}_2\text{O}$ (**1**·2.8CH₃OH·0.2H₂O), $\{\text{Na}_2[\text{Co}^{\text{II}}_2(\text{aib})_2(\text{N}_3)_4(\text{CH}_3\text{OH})_4]\}_n$ (**2**), $[\text{Co}^{\text{II}}_6\text{La}^{\text{III}}(\text{aib})_6(\text{OH})_3(\text{NO}_3)_2(\text{H}_2\text{O})_4(\text{CH}_3\text{CN})_2] \cdot 0.5[\text{La}(\text{NO}_3)_6] \cdot 0.75(\text{ClO}_4) \cdot 1.75(\text{NO}_3) \cdot 3.2\text{CH}_3\text{CN} \cdot 5.9\text{H}_2\text{O}$ (**3**·3.2CH₃CN·5.9H₂O), $[\text{Co}^{\text{II}}_6\text{Pr}^{\text{III}}(\text{aib})_6(\text{OH})_3(\text{NO}_3)_3(\text{CH}_3\text{CN})_6] \cdot [\text{Pr}(\text{NO}_3)_5] \cdot 0.41[\text{Pr}(\text{NO}_3)_3(\text{ClO}_4)_{0.5}(\text{H}_2\text{O})_{1.5}] \cdot 0.59[\text{Co}(\text{NO}_3)_3(\text{H}_2\text{C}(\text{OH})_2)] \cdot 0.25\text{H}_2\text{O}$ (**4**·0.25H₂O), $[\text{Co}^{\text{II}}_6\text{Nd}^{\text{III}}(\text{aib})_6(\text{OH})_3(\text{NO}_3)_{2.8}(\text{CH}_3\text{OH})_{4.7}(\text{H}_2\text{O})_{1.5}] \cdot 2.7(\text{ClO}_4) \cdot 0.5(\text{NO}_3) \cdot 2.26\text{CH}_3\text{OH} \cdot 0.24\text{H}_2\text{O}$ (**5**·2.26CH₃OH·0.24H₂O), $[\text{Co}^{\text{II}}_6\text{Sm}^{\text{III}}(\text{aib})_6(\text{OH})_3(\text{NO}_3)_3(\text{CH}_3\text{CN})_6] \cdot [\text{Sm}(\text{NO}_3)_5] \cdot 0.44[\text{Sm}(\text{NO}_3)_3(\text{ClO}_4)_{0.5}(\text{H}_2\text{O})_{1.5}] \cdot 0.56[\text{Co}(\text{NO}_3)_3(\text{H}_2\text{C}(\text{OH})_2)] \cdot 0.3\text{H}_2\text{O}$ (**6**·0.3H₂O), $[\text{Co}^{\text{II}}_6\text{Eu}^{\text{III}}(\text{aib})_6(\text{OH})_3(\text{NO}_3)_3(\text{CH}_3\text{OH})_{4.87}(\text{H}_2\text{O})_{1.13}](\text{ClO}_4)_{2.5}(\text{NO}_3)_{0.5} \cdot 2.43\text{CH}_3\text{OH} \cdot 0.92\text{H}_2\text{O}$ (**7**·2.43CH₃OH·0.92H₂O), $[\text{Co}^{\text{II}}_6\text{Gd}^{\text{III}}(\text{aib})_6(\text{OH})_3(\text{NO}_3)_{2.9}(\text{CH}_3\text{OH})_{4.9}(\text{H}_2\text{O})_{1.2}] \cdot 2.6(\text{ClO}_4) \cdot 0.5(\text{NO}_3) \cdot 2.58\text{CH}_3\text{OH} \cdot 0.47\text{H}_2\text{O}$ (**8**·2.58CH₃OH·0.47H₂O), $[\text{Co}^{\text{II}}_6\text{Tb}^{\text{III}}(\text{aib})_6(\text{OH})_3(\text{NO}_3)_3(\text{CH}_3\text{CN})_6] \cdot [\text{Tb}(\text{NO}_3)_5] \cdot 0.034[\text{Tb}(\text{NO}_3)_3(\text{ClO}_4)_{0.5}(\text{H}_2\text{O})_{0.5}] \cdot 0.656[\text{Co}(\text{NO}_3)_3(\text{H}_2\text{C}(\text{OH})_2)] \cdot 0.3\text{H}_2\text{O}$ (**9**·0.3H₂O), $[\text{Co}^{\text{II}}_6\text{Dy}^{\text{III}}(\text{aib})_6(\text{OH})_3(\text{NO}_3)_{2.9}(\text{CH}_3\text{OH})_{4.92}(\text{H}_2\text{O})_{1.18}](\text{ClO}_4)_{2.6}(\text{NO}_3)_{0.5} \cdot 2.5\text{CH}_3\text{OH} \cdot 0.5\text{H}_2\text{O}$ (**10**·2.5CH₃OH·0.5H₂O), $[\text{Co}^{\text{II}}_6\text{Ho}^{\text{III}}(\text{aib})_6(\text{OH})_3(\text{NO}_3)_3(\text{CH}_3\text{CN})_6] \cdot 0.27[\text{Ho}(\text{NO}_3)_3(\text{ClO}_4)_{0.35}(\text{H}_2\text{O})_{0.15}] \cdot 0.656[\text{Co}(\text{NO}_3)_3(\text{H}_2\text{O})] \cdot 0.17\text{H}_2\text{O}$ (**11**), $[\text{Co}^{\text{II}}_6\text{Er}^{\text{III}}(\text{aib})_6(\text{OH})_4(\text{NO}_3)_2(\text{CH}_3\text{CN})_{2.5}(\text{H}_2\text{O})_{3.5}](\text{ClO}_4)_3 \cdot \text{CH}_3\text{CN} \cdot 0.75\text{H}_2\text{O}$ (**12**·CH₃CN·0.75H₂O), and $[\text{Co}^{\text{II}}_6\text{Tm}^{\text{III}}(\text{aib})_6(\text{OH})_3(\text{NO}_3)_3(\text{H}_2\text{O})_6] \cdot 1.48(\text{ClO}_4) \cdot 1.52(\text{NO}_3) \cdot 3\text{H}_2\text{O}$ (**13**·3H₂O). Complex **1** describes a distorted tetrahedral metallic cluster, while complex **2** can be considered to be a 2-D coordination polymer. Complexes **3–13** can all be regarded as metallo-cryptand encapsulated lanthanides in which the central lanthanide ion is captivated within a [Co^{II}₆] trigonal prism. dc and ac magnetic susceptibility studies have been carried out in the 2–300 K range for complexes **1**, **3**, **5**, **7**, **8**, **10**, **12**, and **13**, revealing the possibility of single molecule magnetism behavior for complex **10**.

Adres publiczny

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