# Metal−metal interactions in trinuclear copper(II) complexes $[Cu_3(RCOO)_4(H_2TEA)_2]$ and binuclear $[Cu_2(RCOO)_2(H_2TEA)_2]$. Syntheses and combined structural, magnetic, high-field electron paramagnetic resonance, and theoretical studies.

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The trinuclear $[Cu_3(RCOO)_4(H_2TEA)_2]$ copper(II) complexes, where $RCOO^-$ = 2-furoate (**1**), 2-methoxybenzoate (**2**), and 3-methoxybenzoate (**3**, **4**), as well as dimeric species $[Cu_2(H_2TEA)_2(RCOO)_2]\cdot 2H_2O$, have been prepared by adding triethanolamine ($H_3TEA$) at ambient conditions to hydrated $Cu(RCOO)_2$ salts. The newly synthesized complexes have been characterized by elemental analyses, spectroscopic techniques (IR and UV–visible), magnetic susceptibility, single crystal X-ray structure determination and theoretical calculations, using a Difference Dedicated Configuration Interaction approach for the evaluation of magnetic coupling constants. In **1** and **2**, the central copper atom lies on an inversion center, while in the polymorphs **3** and **4**, the three metal centers are crystallographically independent. The zero-field splitting parameters of the trimeric compounds, $D$ and $E$, were derived from high-field, high-frequency electron paramagnetic resonance spectra at temperatures ranging from 3 to 290 K and were used for the interpretation of the magnetic data. It was found that the dominant interaction between the terminal and central Cu sites $J_{12}$ is ferromagnetic in nature in all complexes, even though differences have been found between the symmetrical or quasi-symmetrical complexes **1**–**3** and non-symmetrical complex **4**, while the interaction between the terminal centers, $J_{23}$, is negligible.

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