CuxM1-x(HCOO)2·2H2O, (M=Mn, Co, Ni, Cd): Crystal structures and thermal behavior

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A crystallographic and thermal study of the system CuxM1-x(HCOO)2·2H2O (M:Mn, x=0.47; Co, x=0.35; Ni, x=0.37; Cd, x=0.47) has been performed. The compounds, grown at room temperature, crystallize in space group P2I/c and are isostructural with Cu0.5Zn0.5(HCOO)2·2H2O (1), with the cations sharing the two special position sites M1 and M2. In all cases, the best refinement was achieved with the copper atoms occupying preferentially the hexaformate-coordinated site M1, while the M2+ cations were mainly localized in the M2 sites, in a mixed coordination environment. The compounds present a variety of thermal behaviors, with dehydration taking place at different temperatures and decomposition going from a simple single step process, as in the Zn compound, up to a complex three-stage one as in the Mn and Cd compounds. Decomposition products were identified by X-ray diffraction on quenched samples at the end of each thermal stage. Some discrepancies of the present results with those in the lit