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Hydrothermal syntheses and characterization of phenyl- and benzyl-phosphonates and ethylene- and propylene-diphosphonates of cobalt(II), $A\text{Co}(\text{O}_3\text{PR})_2 \cdot x\text{H}_2\text{O}$ and $A\text{Co}(\text{O}_3\text{P-R-PO}_3) \cdot 2\text{H}_2\text{O}$ ($A = \text{Ca, Sr, Ba}$; $R = \text{Ph, CH}_2\text{Ph, -CH}_2\text{CH}_2\text{-, -CH}_2\text{CH}_2\text{CH}_2\text{-}$)

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Hydrothermal syntheses and characterization of phenyl- and benzyl-phosphonates and ethylene- and propylene-diphosphonates of cobalt(II), $A\text{Co}(\text{O}_3\text{PR})_2 \cdot x\text{H}_2\text{O}$ and $A\text{Co}(\text{O}_3\text{P-R-PO}_3)_2 \cdot 2\text{H}_2\text{O}$ ($A = \text{Ca, Sr, Ba}$; $\text{R} = \text{Ph, CH}_2\text{Ph, -CH}_2\text{CH}_2\text{-, -CH}_2\text{CH}_2\text{CH}_2\text{-}$)

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Abstract

Eight new mono- and diphosphonates of cobalt(II), $A\text{Co}(\text{O}_3\text{PPh})_2 \cdot \text{H}_2\text{O}$ ($A = \text{Ca}$ (**1**), Sr (**2**)), $\text{BaCo}(\text{O}_3\text{PPh})_2 \cdot 2\text{H}_2\text{O}$ (**3**), $A\text{Co}((\text{O}_3\text{PCH}_2\text{Ph})_2 \cdot 2\text{H}_2\text{O}$ ($A = \text{Sr}$ (**4**), Ba (**5**), $A\text{Co}(\text{O}_3\text{P}(\text{CH}_2)_2\text{PO}_3)_2 \cdot 2\text{H}_2\text{O}$ ($A = \text{Ca}$ (**6**), Sr (**7**) and $\text{SrCo}(\text{O}_3\text{P}(\text{CH}_2)_3\text{PO}_3)_2 \cdot 2\text{H}_2\text{O}$ (**8**), were isolated by hydrothermal method and structurally characterized by single crystal X-ray diffraction. They contain tetrahedrally coordinated Co^{2+} ion. The five phenyl- and benzylphosphonates, **1-5** have layered structures, wherein the cobalt and alkaline earth metal ions are ordered, confined approximately to a crystallographic plane and bonded to oxygen atoms of phenyl- or benzylphosphonate moieties and water of crystallization. The diphosphonates **6-8** have pillared-layered structures and the magnetic susceptibilities of compounds **7** and **8** vary with temperature as per the Curie-Weiss law above 10 K.

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