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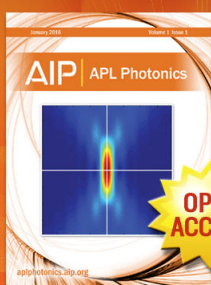
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# Bimetallic derivatives of the $[M(en)_3]^{3+}$ Ion ( $M = Cr$ and $Co$ ): A series of compounds with unusual magnetic and structural properties (abstract)

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The crystal structure and magnetic susceptibility of a series of  $[M(en)_3]^{3+}$  ( $M = Cr$  or  $Co$ ) derivatives are described. In particular, the crystalline structures of (1)  $[Cr(en)_3]_3[FeCl_6]Cl_6 \cdot H_2O$ , (2)  $[Co(en)_3]_3[FeCl_6]Cl_6 \cdot H_2O$ , and (3)  $[Cr(en)_3][FeCl_6] \cdot 11H_2O$  are reported. Structural data, in Å, for these compounds are as follows: (1) space group  $R\bar{3}$ ,  $a = 15.447(4)$ ,  $c = 21.060(6)$ ,  $Z = 3$ ; (2) space group  $R\bar{3}$ ,  $a = 15.346(3)$ ,  $c = 20.880(5)$ ,  $Z = 3$ ; (3) space group  $P3c1$ ,  $a = 11.654(3)$ ,  $c = 15.508(4)$ ,  $Z = 2$ . The main structural feature of the first two isomorphous materials is that they consist of a three-dimensional network of triangular antiprisms formed by the  $[M(en)_3]^{3+}$  ( $M = Cr$  or  $Co$ ) ions and connected with each other by sharing corners. An  $[FeCl_6]^{3-}$  ion is placed at the center of each antiprism. Compound (3) contains a sc arrangement of  $[Cr(en)_3]^{3+}$  and  $[FeCl_6]^{3-}$  octahedra. In addition, the magnetic susceptibilities of the above-mentioned isomorphous compounds and of  $[M(en)_3][FeCl_6]$  ( $M = Cr$  and  $Co$ ) and  $[Cr(en)_3][InCl_6]$  are reported. While  $[Cr(en)_3]_3[FeCl_6]Cl_6 \cdot H_2O$  orders as a ferrimagnet at 0.91 K,  $[Cr(en)_3][FeCl_6]$  exhibits antiferromagnetic properties with  $T_c = 2.26$  K, a temperature rather similar to the antiferromagnetic ordering temperature of  $[Co(en)_3][FeCl_6]$ .