

**Crystal Structure of *trans*-[Co{N(CN)<sub>2</sub>}<sub>2</sub>(L)<sub>2</sub>]<sub>n</sub>,  
(L=1-vinylimidazole)**

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The reaction of cobalt nitrate, 1-vinylimidazole (L) and NaN(CN)<sub>2</sub> provided the polymeric complex [Co{N(CN)<sub>2</sub>}<sub>2</sub>(L)<sub>2</sub>]<sub>n</sub>. The crystal structure of the light red complex was determined by X-ray crystallography. Crystal data at 293K are  $a=9.092(2)\text{Å}$ ,  $b=14.332(2)\text{Å}$ ,  $c=7.291(2)\text{Å}$ ,  $\beta=113.60(2)^\circ$ ,  $P2_1/c$ ,  $V=870.6(3)\text{Å}^3$ ,  $Z=2$ ,  $D_c=1.447\text{ g/cm}^3$ ,  $\lambda(\text{Mo } K_\alpha)=0.71073\text{Å}$ ,  $R=0.062$ , and  $\omega R=0.076$  for 1603 observed reflections. The structure consists of octahedrally coordinated cobalt atoms in which the coordination sites are occupied by four N-terminal atoms of dicyanamide ligands and two N atoms of two 1-vinylimidazole ligands in *trans* arrangement. Two of the dicyanamide ligands act as end-to-end bridging ligands with one neighboring cobalt atom, and the other two also act as end-to-end bridging ligand with the other neighboring cobalt atom, giving a uniform one-dimensional system. The bond distances of Co(1)-N(1) and Co(1)-N(3b) are 2.123(5)Å and 2.129(5)Å, respectively. The angles of Co(1)-N(1)-C(1) and Co(1)-N(3b)-C(2b) are also observed to be 160.3(5)° and 161.0(6)°, respectively. The dicyanamide ligand is angular with 117.6(6)° of the C(1)-N(2)-C(2) and with averaged 175.8° of two adjacent linear N-C-N units. Intrachain Co...Co distance is 7.291Å (c axis of the cell).