Crystal Structure Elucidation of Anhydrous Rb$_2$[Pt(CN)$_4$] from X-Ray Powder Diffraction Data

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The title compound has been synthesized by metathesis of Ba[Pt(CN)$_4$]· 4 H$_2$O with Rb$_2$SO$_4$, in aqueous solution. Its crystal structure was solved from X-ray powder diffraction data using the simulated-annealing approach, and refined by Rietveld’s method. The compound crystallizes in space group Imma, $a = 11.1432(2), b = 7.4382(1), c = 11.1896(2)$ Å, $V = 927.45(3)$ Å$^3$, $Z = 4$, $R_p = 0.0402$, $R_w = 0.0247$ ($N_{hkI} = 173$). Square-planar tetracyanoplatinate groups stack in an unprecedented eclipsed conformation, forming one-dimensional linear chains of Pt-atoms with Pt–Pt separations of 3.719 Å. Rb$_2$[Pt(CN)$_4$] was characterized by differential thermal analysis, thermogravimetry and infrared spectroscopy.

Key words: Cyanoplatinate, Rubidium, IR Spectroscopy, X-Ray Powder Diffraction