Cs₂K₂[Pt₁₂O₈(SO₄)₁₂]: A New Oxide-Sulfate with the Cluster Anion [Pt₁₂O₈(SO₄)₁₂]⁴⁻

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Z. Naturforsch. 61b, 912 – 915 (2006); received March 29, 2006

Dedicated to Professor Wolfgang Jeitschko on the occasion of his 70th birthday

Single crystals of Cs₂K₂[Pt₁₂O₈(SO₄)₁₂] (R̅3, Z = 3, a = 1198.9(3), c = 2768.9(9) pm, R_{all} = 0.1154) were obtained by the reaction of Cs₂[Pt(NO₂)₄], K₂[Pt(NO₂)₄] and conc. sulfuric acid at 400 °C in a sealed glass ampoule. The compound contains the cluster anion [Pt₁₂O₈(SO₄)₁₂]⁴⁻. It consists of six Pt₂⁶⁺ dumbbell shaped cations that are linked by eight oxide ions and twelve sulfate anions to form a distorted Pt₁₂ icosahedron. The arrangement of the cluster anions in the crystal structure provides two voids for the cations. The larger one is occupied by the Cs⁺ ions while the K⁺ ions reside in the smaller one. For the Cs⁺ ions the coordination number is 15 while the K⁺ ions have a coordination number of 13.

Key words: Platinum, Sulfates, Cluster, Crystal Structure, Solvothermal Reactions