## Synthesis and X-ray Study of $[Pt(NH_3)_4](ReO_4)_2$ Thermolysis Products

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Catalysts based on the Pt and Re play an essential role in reforming processes. About 65% of all the produced rhenium is used for these needs. One of the methods to prepare catalysts is the thermolysis of inorganic complex salts, containing two required metals. In this work we have studied the precursor complex  $[Pt(NH_3)_4](ReO_4)_2$  and obtained a solid solution  $Pt_{0.33}Re_{0.67}$ .

A synthesis of the precursor complex [Pt(NH<sub>3</sub>)<sub>4</sub>](ReO<sub>4</sub>)<sub>2</sub>, was held in the following way: 0.2 M water solutions of [Pt(NH<sub>3</sub>)<sub>4</sub>]Cl<sub>2</sub> and NaReO<sub>4</sub> were mixed at 50°C, then kept for an hour at room temperature. A white residue was separated and washed away with water and acetone. The yield is 75%. The crystal structure of [Pt(NH<sub>3</sub>)<sub>4</sub>](ReO<sub>4</sub>)<sub>2</sub> was determined with a X8APEX Bruker diffractometer (MoK $\alpha$ -radiation,  $\theta$  range 2.85—32.59°, 2007 independent reflections), R = 2.11%. Crystal data: a = 5.1847(6), b = 7.7397(8), c = 7.9540(9) Å,  $\alpha$  = 69.531(3),  $\beta$  = 79.656(3),  $\gamma$  = 77.649(3)°, V = 290.19(6) Å<sup>3</sup>, space group P-1, Z = 1. This complex is isostructural to [Pt(NH<sub>3</sub>)<sub>4</sub>](TcO<sub>4</sub>)<sub>2</sub> [ICSD Card 65-766]. The structure consists of the isolated complex [Pt(NH<sub>3</sub>)<sub>4</sub>]<sup>2+</sup> and ReO<sub>2</sub><sup>-</sup> ions.

The thermolysis of  $[Pt(NH_3)_4](ReO_4)_2$  was carried out at 900°C in H<sub>2</sub> atmosphere for 7 hours. According to X-ray analysis, the product is a single phase solid solution  $Pt_{0.33}Re_{0.67}$ . It is based on the hexagonal close-packed rhenium structure. Crystal data of the solid solution: a = 2.764(2), b = 4.415(3) Å, V = 29.21 Å<sup>3</sup>, space group P6<sub>3</sub>/mmc, Z = 2. Keywords: platinum group, x-ray analysis, single-crystal structure analysis