New Process for Separation and Recovery of Platinum Group Metals

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Abstract
In order to develop an environmentally-sound materials recycling process, we investigated a new recycling process of platinum group metals (PGMs), particularly Rh, Ru, and Ir. The sustainable recycling process consist of a series of new pretreatment methods and a successive leaching step in aqueous solution without using any harmful oxidizing agent. During pretreatment, PGMs were reacted with Mg at 1193 K to obtain PGM-Mg alloys, which were then chlorinated using CuCl₂ or other chlorination agents in the temperature range of 673–873 K. Finally, the obtained samples were dissolved in aqueous solutions of HCl or NaCl, which are free from strong oxidizer. The experimental results showed that valuable PGMs could be recovered by using a combination of the proposed pretreatment method and subsequent dissolution in HCl or NaCl solution. Currently, studies are underway for developing an effective pretreatment-dissolution combination for the successful recovery of PGMs.

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