

Palladium recovery from spent Pd plating solutions using Lewatit TP 214 resin

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ABSTRACT

This study aims to explore the recovery of palladium (Pd(II)) ions using Lewatit TP 214 resins. Waste Pd(II) ions with ammonia complex procured from a precious metal plating were selected as the source solution. In the experimental studies, two stock solutions of 60 ppm Pd(II) with a pH value of 4.0 and 7.5 were prepared as initial solutions. The experiments were performed by altering four parameters: solution pH, time 15–180 min, temperature 25°C–60°C, and amount of resin 100–400 mg. It was proved that the recovery percentage increased with higher temperature and resin at lower pH values. The Pd(II) recovery percentage increased with a temperature rise, reaching 100% after 40 min at pH 4.0 and 60°C. On the other hand, a bit lower efficiency (95%) was attained after 180 min at pH 7.5 and 60°C. Using Lewatit TP 214, the computed activation energies for Pd(II) recovery are 17.73 and 15.62 kJ/mol at pH 4.0 and 7.5, respectively. Considering these activation energy values, a mixed mechanism dominated the recovery of Pd(II).

Keywords: Palladium recovery; Waste plating solution; Ion-exchange resin; Lewatit TP 214

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