

# Hydrometallurgical Recovery of Platinum Group Metals from Spent Catalytic Converters Using Water-in-Salt Leaching Solutions

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Spent automotive catalytic converters (SACC) are a significant secondary source of rare and valuable materials, especially platinum group metals (PGM).[1] PGM - platinum, palladium, rhodium, osmium, iridium, and ruthenium - are identified as materials facing a significant risk of supply scarcity by the European Union's Critical Raw Materials (CRM) list.[2] Over the past few decades, driven by the increase in global vehicle production and the adoption of stricter environmental regulations, there has been a rapid and substantial growth in the accumulation of SACC, without a matching increase in recycling rates.[3] Conventional techniques for PGM extraction often entail employing *aqua regia*, a corrosive mixture of hydrochloric and nitric acids, notorious for its safety hazards and environmental impact. This work propose an alternative approach utilizing a “salt-based *aqua regia*” method, wherein aluminium chloride and nitrate combinations serve as substitutes for the conventional inorganic acids, efficiently dissolving more than 90 % of Pt. The concentration of salts, solid:liquid ratio, reaction temperature, and time were fine-tuned. Analysis indicated that temperature was the predominant influencing factor. In the purification stage, adsorption using the ionic exchange resin Ambersep 900® was conducted. In the refining process, thiourea served as a stripping agent, yielding platinum with a purity of 98%.

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## References

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