



SAFE, SUSTAINABLE AND SELECTIVE METHODS FOR DISSOLUTION AND RECOVERY OF NOBLE METALS

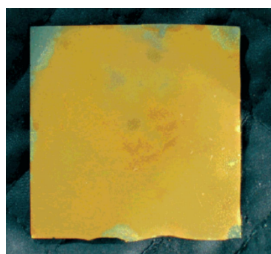
Academy of Finland project 282555

The research project focuses on the development of novel etchant systems for dissolution of noble metals, especially Au and Pt.

SUSTAINABLE USE OF NOBLE METALS

Noble metals are scarce on Earth but demand for them is expected to grow continuously. Especially Pt and Au have a wide range of applications in the modern society due to their chemical and physical properties (good conductors, soft, ductile, resistant to oxidation and high temperature corrosion). They are used for example in catalysis, electronics, sensing, pharmaceuticals and sustainable energy production such as fuel cells.¹ Recovery of high-purity noble metals by recycling processes will be more and more imperative for sustainable use of the noble metals.^{1a}

RECOVERY OF NOBLE METALS



Dissolution of the thin Au film begins from the edges.

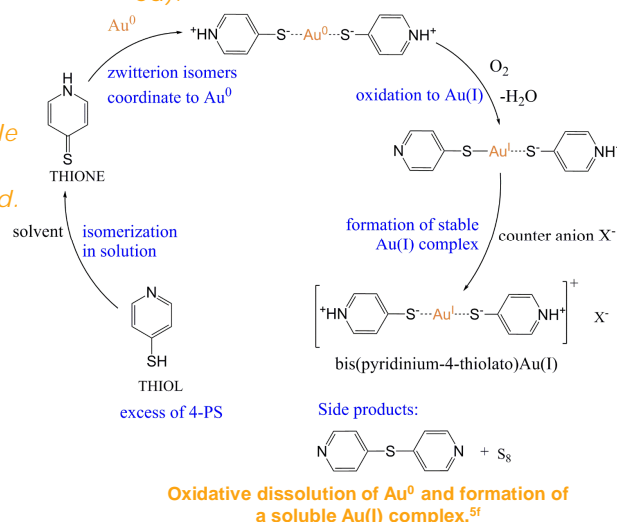
Dissolution of noble metals is important for metallurgy, catalysis, organometallic chemistry, syntheses, applications of noble metal nanoparticles and after all in recycling.² Highly corrosive aqua regia (HNO₃/HCl 1:3) has been used for centuries and is still in use for oxidative dissolution of noble metals such

as Au, Pd and Pt. Alternatively, other strong reagents like cyanide solutions containing mild oxidants or pyrometallurgical chlorination e.g. with Cl₂ or COCl₂ can be used.³

To recover dissolved noble metals, subsequent precipitation or absorption processes are employed but it is challenging to extract a sole noble metal with a high purity.^{2,4}

DISSOLUTION OF Au, Pd AND Pt BY NON-CONVENTIONAL SYSTEMS

Novel, safe, efficient and sustainable routes for noble metal dissolution and recycling are highly needed.



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