

Press release

Defence on 23 April 2021

Alternative methods to cyanide for gold leaching and recovery

Title of the doctoral thesis Leaching and recovery of gold from low grade raw materials in cyanide-free media

Content of the doctoral thesis This research proposes a new method for recovering gold from low grade raw materials. High grade gold ore deposits which have been the main source of gold are depleting fast, while low grade ore and residues are currently underutilized. During processing, cyanide is the most common reagent used to extract gold from raw materials, however it may pose a risk towards environment and human life in case of spillage or process failure. Therefore, its use has been restricted or even forbidden in certain geographical areas of the world.

Globally, several alternative lixivants to cyanide have therefore been intensely investigated. However, there is currently only one cyanide-free industrial process for recovering gold from ore. In this research, chloride and glycine as alternatives to cyanide were investigated in gold processing. Chloride has already earlier been historically used in gold processing, while interest towards non-toxic glycine has increased only recently. This study proved for the first time, the applicability of glycine (without catalyst) for the extraction of gold from gold ore in an intensively agitated reactor and in the presence of adequate oxygen. The results suggest that equal or even higher efficiencies in gold extraction could be achieved using these chemicals with lower toxicity and potentially lower risk to the environment.

Furthermore, a novel method - namely electrodeposition-redox replacement (EDRR) – was investigated for the first time in gold recovery from both chloride and glycine solutions. The results showed that this electrochemical method is technically feasible and may provide alternative carbon free gold recovery for future gold processing.

Field of the doctoral thesis Processing of materials

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Link to electronic thesis <https://aaltodoc.aalto.fi/handle/123456789/103340>

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