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Extraction of tungsten from mine tailings: LDH- and EDTA-assisted scheelite dissolution

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The ANR VARTA project (VAlorization and Remediation of TAilings of W-ores) aims to minimize the environmental impact of mine tailings while reducing European dependence on the critical resources of tungsten. The goal is to carry out the solubilization of scheelite mineral ($CaWO_4$) in order to extract the tungsten in mild acid solutions using a Layered Double Hydroxide (LDH) as anion exchanger [1].

Thus, the uptake of polytungstates anions can be performed using an LDH with Mg-Al layers, initially intercalated with carbonate ions. In a second step, the tungsten can be released in alkaline conditions, due to the instability of the polyanions species. Moreover, the addition of ligands with an affinity for Ca also promotes the dissolution of scheelite [2]. Both these mechanisms allow to increase the scheelite solubility and the dissolution rate, and they have been investigated by batch experiments, solid and solution characterization, and thermodynamic modelling.

[1] Lefèvre, Lion & Makolana (2017), *Sep. Sci. Technol.* 53, 1-10.

[2] Konishi, Katada & Asai (1990), *Hydrometallurgy* 23, 141−152.

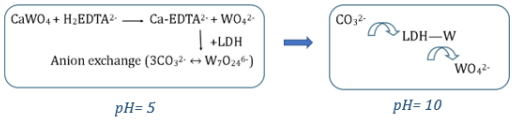

Fig. 1 Schematic representation of scheelite solubilization (on the left) and tungsten recovery (on the right).