

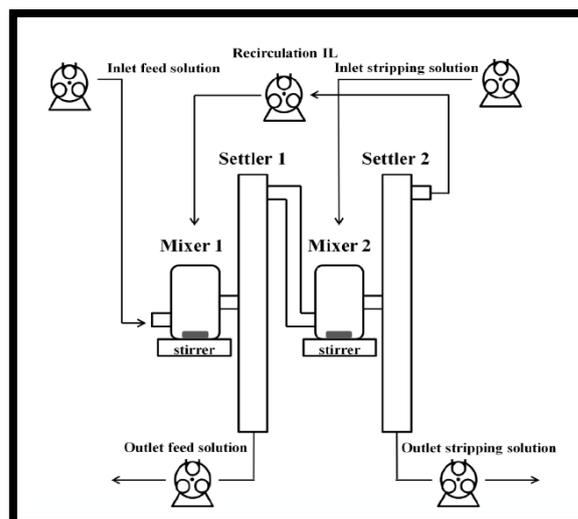
Cobalt Recovery with Ionic Liquid from Waste-Water Using a Continuous Liquid- Liquid Extraction Process

Background:

The water purification companies, chemical and mining industries produce numerous aqueous streams polluted with valuable (heavy) metal salts. Economically and technically, it is challenging to remove these impurities from the water before reuse or discharge. Furthermore, it is challenging to selectively separate the different metal salts from each other in order to recover them from the water at a high value. The idea in this proposal is to apply liquid-liquid extraction using novel extractants to selectively recover valuable metals, while at the same time producing clean water. This means that regeneration of the solvent is essential and the metal salt should be recovered as a concentrated (solid) product. Extraction offers several advantages over competing techniques, both on lab scale and industrial scale: (i) operation in a continuous mode, (ii) employment of relatively simple equipment, and (iii) the employment of only small quantities of reagent. The sustainability of the extraction process is improved by applying a new class of nature-based water-immiscible extractants “hydrophobic ionic liquids”.

Your Task:

1. Literature review of continuous extraction/regeneration process for metal salts from water. Currently CoCl_2 is investigated.
2. Synthesize ionic liquid and testing extraction/regeneration ability of the selected salt (currently $[\text{P8888}][\text{Oleate}]$ is used).
3. The main focus will be on startup, operating and optimizing the continuous extraction/regeneration setup. Investigating the effect of process parameters like concentration of metal salt in water, ratio of extractant to water stream, regeneration procedure etc.
4. Write a master thesis.



Your Profile:

- You have a chemical engineering/ process technology background, preferably in the field of chemistry
- You are able to work independently and you have good analytical and experimental skills
- You are fluent in English (speaking and writing) and are willing to work in an international environment

Duration, salary and location:

- The duration of your internship or thesis will be at least 7 months at the water technology institute Wetsus in Leeuwarden, Netherlands.
- Salary : 350 € per month

Contact details:

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