Cobalt Extraction with Ionic Liquid from Waste-Water Using Single Drop Extraction Column

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 on single drop extraction column and mass transfer behavior of salt into organic droplet.
2. Synthesize ionic liquid and performing extraction/regeneration ability of the selected salt (currently [P8888][Oleate] is used).
3. The main focus will be on operating single drop extraction column and optimizing the process such as feed concentration, drop size, drop speed etc.
4. Perform mass transfer calculation in order to understand the behavior of IL droplet in aqueous phase
5. Write a thesis.

Your Profile:

- Education/Background:
  - chemical engineering/ process technology, preferably in the field of chemistry.
- Language Proficiency:
  - fluent in English (speaking and writing).
- Skills and Abilities:
  - able to work independently and you have good analytical and experimental skills.
  - willing to work in an international environment
  - Excellent computer skills (Word, Excel and PowerPoint), and preferably Math lab.

Duration, salary and location:

- The duration of your internship or thesis will be at least 6 months at the water technology institute Wetsus in Leeuwarden, Netherlands.
- Salary : 350 € per month

Contact details:

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