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# Selective Separation of Copper and Nickel by Membrane Extraction Using Hydrophilic Nanoporous Ion-exchange Barrier Membranes

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## Highlights

- Highly selective separation of Cu<sup>2+</sup>/Ni<sup>2+</sup> was achieved using membrane extraction
- Hydrophilic nanoporous membrane (PES/SPPEK membrane) was used for Cu<sup>2+</sup>/Ni<sup>2+</sup> separation
- Higher copper flux was observed in sandwiched membrane extraction due to the coupling of stripping
- The membrane showed high stability in the organic extractant

## Abstract

Hydrophilic nanoporous ion exchange barrier membrane, based on polyethersulfone (PES) /sulfonated polyphenylether sulfone ketone (SPPEK), was utilized for the pH dependent separation of copper and nickel ions with a commercial extractant, LIX84-I. The extraction and stripping performance of the membrane was demonstrated in a single stage membrane contactor as well as in an integrated extraction/stripping system. By adjusting the feed pH to 2.9, a complete separation of copper and nickel was achieved using the membrane contactors, where a copper flux of  $1.10 \times 10^{-8}$  mol/cm<sup>2</sup>.s was observed. In an extraction/stripping integrated

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