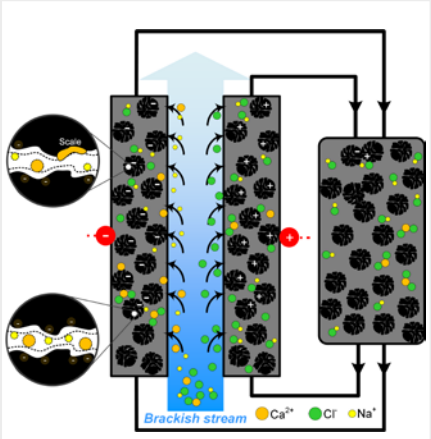
Flow-electrode capacitive deionization for resource recovery

Water Research Centre, School of Civil and Environmental Engineering

Flow-electrode capacitive deionization (FCDI): Similar to capacitive deionization, FCDI is based on the formation of electrical double layers (EDLs) in charged suspensions of electrodes enabling capacitive energy storage with the minority charged constituents immobilized and selectively extracted from the saline water.



Low-cost operation of flow-electrode CDI

Competitive advantage

- Low-cost, viable alternative for resource recovery (e.g., ammonia, phosphorous and lithium) from waste streams;
- The use of flowable materials allows for the easy management of the electrode and continuous operation of the system.

Recent research projects

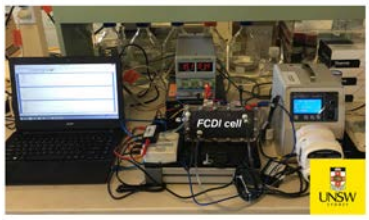
- Flow-electrode CDI and its applications for brine desalination;
- Optimisation of the flow-electrode and stacking of FCDI cells;
- Nutrient recovery from sewages by integrated flow-electrode/membrane systems;
- Noble metal recovery from brines and industrial wastewaters by flow-electrode CDI.

Successful applications

- Capacitive membrane stripping for ammonia recovery from wastewaters (CapAmm, Provisional Patent Application No. AU2017904868);
- Flow-electrode CDI for brackish groundwater desalination and softening.

Facilities and infrastructure

- UNSW Water Research Centre has extensive research resources and facilities including laser cutter, CNC mill, potentiostat electrochemical working station and stopped-flow instrumentation which ensures the implementation of high-quality research and development.



Composite current collector for FCDI and a bench-scale FCDI system

More information

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