

Lithium enrichment by ultrafast filtration using ion-selective nanoporous atomically thin membranes

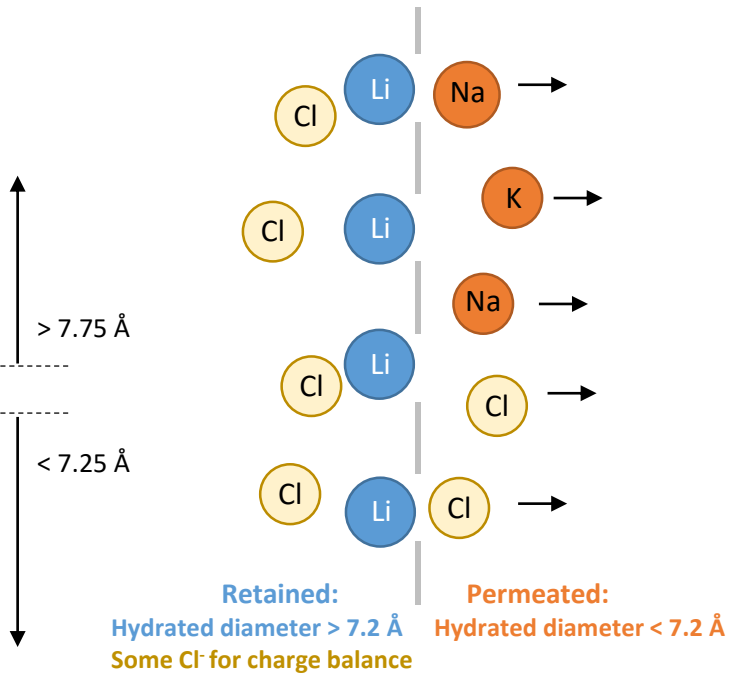
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Recovery of lithium from geothermal brines and other dilute streams will help to meet the demand for batteries for electric vehicles in the future

However, the low concentration of lithium in the range of (0.01 wt%) in a background of other salts poses a major challenge

Ion	Hydrated Diameter (Å)	Salton Sea Geothermal Brine (mg/kg)
Fe ²⁺	8.56	1560
Ca ²⁺	8.24	27400
Sr ²⁺	8.24	411
Ba ²⁺	8.08	203
Li ⁺	7.64	194
Na ⁺	7.16	53000
Cl ⁻	6.64	151000
K ⁺	6.62	16700
Br ⁻	6.60	99
Rb ⁺	6.58	170



The team proposes to use graphene with sub-nanometer sized pores to selectively filter out lithium ions based on differences in ion size and charge

The membranes further offer low resistance to flow and high chemical stability, enabling savings in energy, space, and cost