Lithium Enrichment by Ultrafast Filtration Using Ion-Selective Nanoporous Atomically Thin Membranes

Extraction of lithium from geothermal brines in an economical, environment-friendly, and practical manner is an enormous challenge due to the low levels of lithium in a background of many other salts. The Nanoporous Graphene Membrane team is developing advanced membranes that are thermally and chemically stable and can selectively permeate ions at high rates toward enabling enrichment, concentration, and extraction of lithium from geothermal brines. Low energy consumption, chemical and thermal stability, high productivity, and ability to distinguish between ions are key features of the membranes that open up the potential for direct extraction of lithium from geothermal brines at estimated costs below $5000 per ton. The membranes also have potential to work in tandem to reduce the energy and environmental footprint of other extraction processes.