

Extraction of lithium from geothermal brines

Problem:

In recent years, lithium gained attention due to its use in lithium-ion batteries e.g. for electric vehicles. Conventional processes for lithium production are evaporation of high-saline brines (e.g. in Chile) or mining lithium rich ores (mainly in Australia). To increase independence from lithium suppliers, lithium extraction from geothermal brines is a promising approach. For example, geothermal brines in Upper Rhine Valley, Germany have lithium concentrations up to 250 mg/L. Due to the characteristics of geothermal brines (including high salt concentration, presence of dissolved gases, high temperatures and relatively high pressure) selective extraction of lithium is challenging.

Tasks:

The aim of this work is to develop a selective lithium extraction process utilising monoselective electro dialysis and to produce lithiumhydroxide or lithiumcarbonate with bipolar membrane electro dialysis. The selectivity of these processes will be evaluated as well as the influence of elevated temperature of the stability of the electro dialysis membranes.

In order to protect the extraction step, pretreatment of the brine with e.g. nanofiltration or ultrafiltration will also be studied. The applicability of these processes for geothermal brines will be evaluated.

The scope of the assignment can be adapted to a Bachelor's, Master's thesis or a study project as desired. Possible languages are English and German.

Especially suitable for students of the disciplines: BIW, CIW, VT, WaSE

More Details: <http://wasserchemie.ebi.kit.edu/>

Type of work: Primarily practical

Beginning: Immediately, after consultation

Supervision: Engler-Bunte-Institute, Chair of Water Chemistry and Water Technology

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