



SysCAD

Design | Operate | Optimise

OLI Engine in SysCAD

- SysCAD with OLI combines a best-in-class simulation platform with industry-leading electrolyte thermodynamics.
- Model full chemical processing plants where electrolyte chemistry is critical for design, operation and optimisation.
- Produce higher fidelity mass and energy balances with embedded OLI data and calculations using the Thermodynamic Calculation Engine (TCE) add-on.
- Access multiple OLI models for complex calculations *as required*, balancing accuracy and computational solver speed. TCE features parallel processing.
- Use OLI-enabled inline unit operations and side calculations in SysCAD to manipulate model parameters or provide useful additional information.
- Distributed with a suite of example projects, including Lithium and Potash.
- Available through joint efforts with our Alliance Partner, OLI Systems.

Applications where Electrolyte Chemistry is Critical



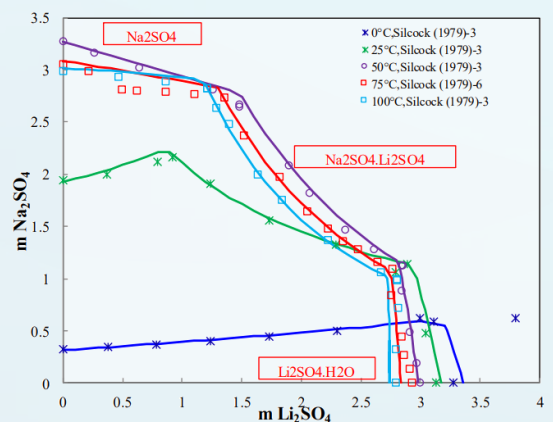
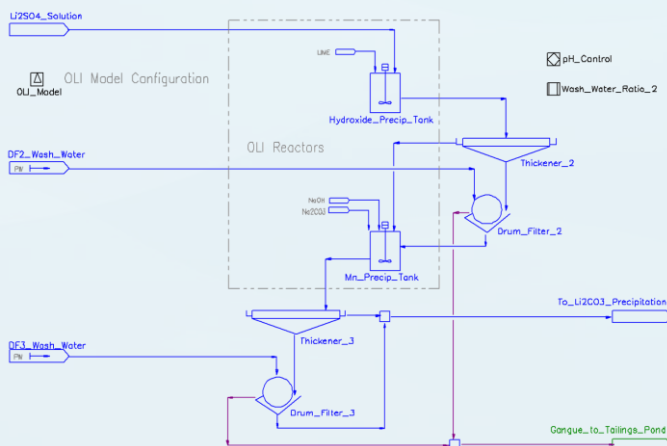
Hydrometallurgy
Ponds & Evaporators
Crystallisation



Desalination
Brine Valorisation
Salt Processing



Water Treatment
Reverse Osmosis
Solvent Extraction



A.J. Gerbino et al. (2020) "Breakthrough Chemistry Simulations for Lithium Processing", OLI Systems

Enhance Your Process Simulation Accuracy with OLI

SysCAD TCE add-on with OLI seamlessly integrates the high-fidelity thermodynamic calculation engine directly into your model.



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Features

Electrolyte Properties	Calculation of thermodynamic and transport properties for electrolyte systems, e.g. pH, osmotic pressure, ionic strength, electrical conductivity, boiling point, and more.
Unit Operations	A wide range of OLI-enabled SysCAD unit models, including reactors, evaporators, solvent extraction, reverse osmosis and side calculators. Advanced target solving options are available for phase or species formation, enthalpy targets, etc. Models call OLI Engine to determine the final composition and properties.
Component Database Species / Ion Mapping	Automated species mapping for seamless integration between SysCAD and OLI. Customisable reverse ion mapping algorithms allow conversion of true OLI species (ions, salts, acids) into their representative apparent species.
Flexible Model Implementation	Use different OLI models as required in different areas of the SysCAD plant model. For example, this allows a solid to precipitate in one area of the process where it is kinetically favourable, while preventing formation in another area.

Capabilities

Activity Coefficients for Complex and Concentrated Systems	The aqueous (AQ) model is based on the combined work of Bromley, Zemaitis, and Pitzer. The mixed-solvent electrolyte (MSE) activity coefficient model is based on OLI's internal development, which is published extensively in peer-reviewed literature.
Complete Speciation	The OLI AQ model predicts and considers all true species in solution from -50 to 300 °C, 0 to 1500 bar, and 0 to 30 molal ionic strength, while the MSE model temperature limit is 90% of the critical temperature with no concentration limit.
Standard State Framework	Based on Helgeson equation of state, parameter regression and proprietary estimation techniques for the AQ framework, and on OLI technologies for the MSE framework.
Comprehensive Databanks	The OLI databank includes 80 inorganic elements, associated solution species and complexes, and hundreds of hydrophobic and hydrophilic organics.
Thermophysical Properties	OLI computes thermodynamic and transport properties including ionic strength, osmotic pressure, electrical and thermal conductivity, density, enthalpy, entropy, boiling point elevation, and viscosity for complex electrolyte mixtures.
Dynamic Applications	OLI can be embedded into dynamic simulations in SysCAD allowing for modelling of production ponds, filter presses, ion exchange columns, and more.

Applications

Lithium	Potash	Rare Earth Elements	Dynamic Modelling
Leaching of Ores	Brine Handling	Evaporation Ponds	Acid Neutralisation
pH Control	Scrubbers	Solubility	Mixture Properties
Water Treatment	Trace Metal Removal / Recovery	Crystallisation & Precipitation	Environmental & Regulatory Limits



A separate OLI license is required alongside the SysCAD TCE add-on.
For more information about OLI:

- ➔ Visit their website at www.olisystems.com
- ➔ Contact them at sales@olisystems.com