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Title: Implementation of ChemApp in SysCAD for High Fidelity Pyrometallurgical Process Simulation

A new tool for accurate simulation of pyrometallurgical processes has been developed through implementation of ChemApp within SysCAD. SysCAD is a flexible process simulator which is widely used in a growing number of industries. A link has been developed which allows ChemApp to be used directly within a SysCAD process flowsheet. The implementation allows for efficiency and flexibility to mix standard SysCAD and ChemApp unit operations, enabling ChemApp calculations only when required to characterise a process. Furthermore, a single SysCAD process model can utilise multiple ChemApp solution databases in different areas of the plant, and can even call other thermodynamic engines (e.g. OLI, PHREEQC, AQSol). The link is compatible with all FactSage and ChemSage solution databases. Calculations using the Constrained Free Energy (CFE) method as well as phase target routines are allowed. The capabilities of this link are demonstrated using a laterite smelting process model using a solution database example from M4Dynamics. This process model also features an alkaline scrubbing offgas treatment circuit, which uses OLI to calculate the scrubber water chemistry. In summary, ChemApp in SysCAD brings the powerful capabilities of the platform that existing users are familiar with to users modelling pyrometallurgical processes.