FACULTY OF ENGINEERING AND ARCHITECTURE

Department of materials, textiles and chemical engineering
Sustainable materials science

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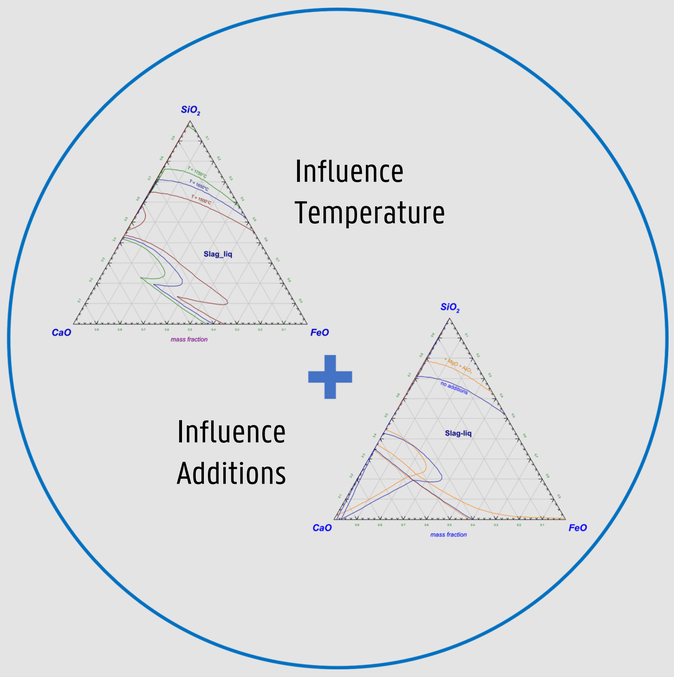
Interactive industrial application to represent isothermal sections of multi-component phase diagram

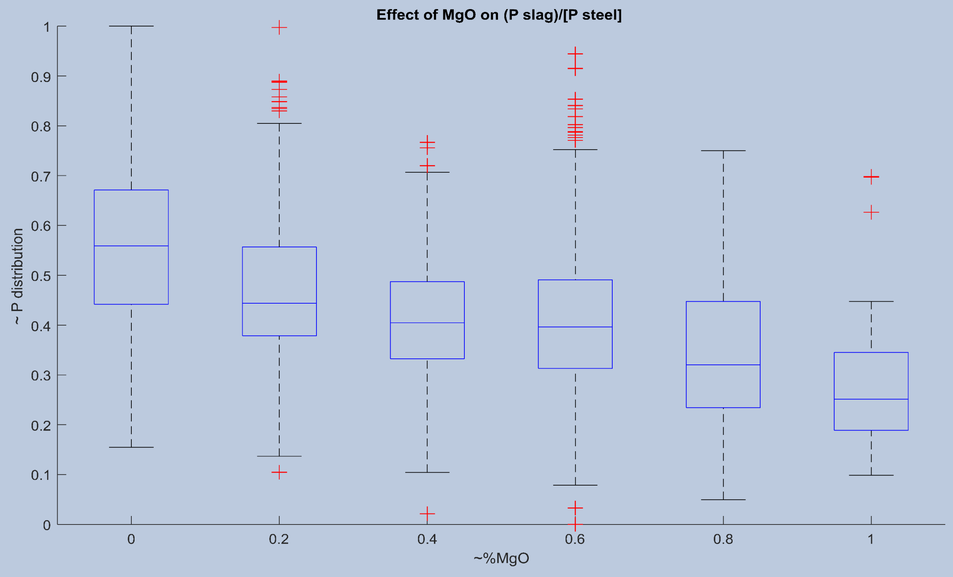
Outline of the application

Multiple isothermal sections of multi-component CaO-FeO-SiO_2 phase diagrams yield valuable information. Yet, superimposing figures fails to immediately interpret evolutions and trends.
An interactive application was developed to enhance interpretation possibilities. With the application, temperature and composition can be set, while the corresponding figure varies accordingly.

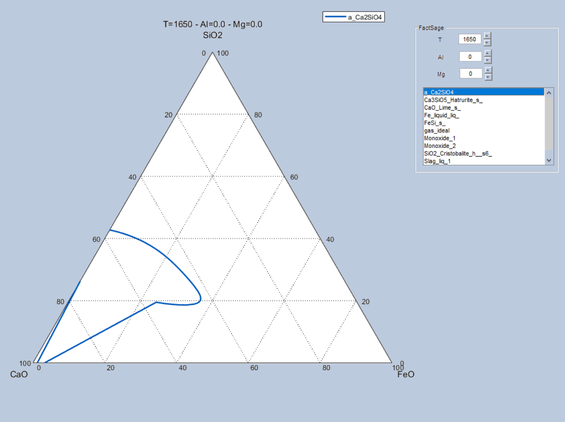
The isothermal sections were calculated with Factsage 7.1 FToxid in equilibirum with Fe(liq).



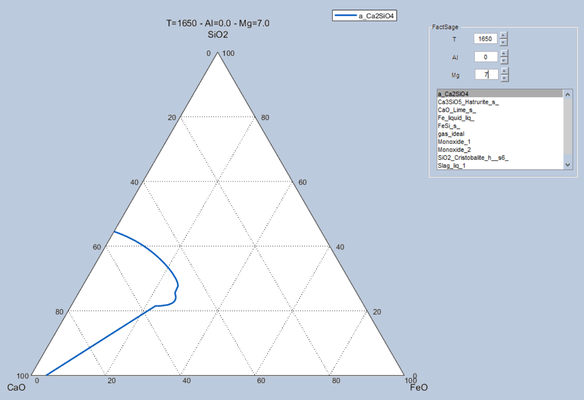
Case 1: Effect MgO on deP



Industrial data: for a fixed temperature interval the (P slag) / [P steel] ratio decreases with increasing MgO content
Literature: C_2S-rich regions = crucial in the deP-process
Industrial application: area C_2S-rich regions decreases with increasing MgO content



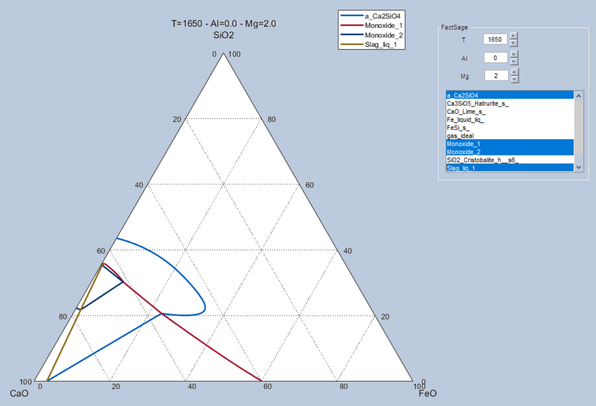
C_2S-rich region on the CaO-FeO_n-SiO_2 phase diagram at T = 1650°C and **0 wt% MgO**



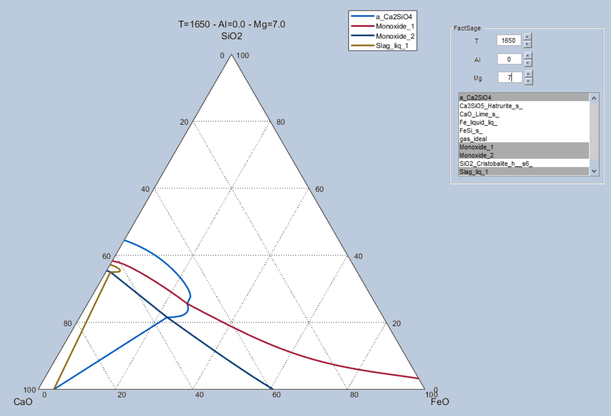
C_2S-rich region on the CaO-FeO_n-SiO_2 phase diagram at T = 1650°C and **7 wt% MgO**

Case 2: Effect MgO on refractory

Industrial experience: addition of MgO = positive for refractory wear from a threshold value onwards
Industrial experience: Refractory wear linked with MgO saturation
Industrial application: As shown, the saturation line of MgO only appears once a certain MgO concentration is achieved
(Note: both CaO and MgO rich phase are labelled Monoxide)



CaO-FeO_n-SiO_2 phase diagram at T = 1650°C and **2 wt% MgO**



CaO-FeO_n-SiO_2 phase diagram at T = 1650°C and **7 wt% MgO**

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