Using FactSage to microanalytically assess metallurgical slags

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Metallurgical slags gained interest as a byproduct with great recycling potential. Examples for the successful application are frequently reported and industrially implemented. The cement industry uses Blast Furnace Slags as granulated slag due to their cementitious performances. The fertilizer industry values converter slags for the high calcium oxide and phosphate contents. The chemical composition of slags often reveals them as synthetic rocks. Therefore, they can be used as building material substitutes and help preserve natural resources. To determine the field of applications of metallurgical slags different sets of parameters are checked. The eligibility for example as a substitute construction material depends on mineralogical and chemical composition of the slag. Converter and Electric Arc Furnace slags need to have low amounts of free calcium- and magnesium oxide as an example that shows volume stability. The knowledge of the macro- and microscopical properties help the metallurgists to a better slag management. The mineralogical phases determined by XRD answers questions on a macroscopical level. The determination on the microscopical level in this study was conducted by SEM/EDX analysis. FactSage was used to simulate the process of slag formation based on XRF analysis and was compared to EDX analysis of certain phases. In this process, the collected mineralogical and chemical data can be compared and analyzed quickly with the use of Macros. The study compared the results of XRD analysis with those of SEM/EDX with the help of FactSage. The comparison showed that the less dominant phases can be documented with SEM/EDX analysis. Less prominent elements and their position in the slag matrix can be determined.