Application of private database development feature in FactSage for modeling the liquid steel solution

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FactSage provides convenient ways to study steel-slag-inclusion system relevant for secondary steelmaking. It is possible to do kinetic calculations to predict steel, slag and inclusion compositions during industrial process and laboratory experiment in addition to usual single point equilibrium calculation. Several studies have been done in recent past to demonstrate this capability. One intriguing aspect from these studies is the behavior of calcium in liquid steel solution. For a typical aluminum-killed steel, laboratory experiments do not show significant calcium modification of alumina or spinel inclusions. However, plant data sometimes tend to show presence of such inclusions-it is difficult to know whether these are modified alumina/spinel inclusions or entrapped slag droplets. Nevertheless, FactSage calculations show that such modification is possible. In order to resolve this ambiguity, the feature of creating private database for liquid steel is being explored. It is possible to change Ca-O interaction parameters in a classical Wagner formalism and to change the free energy of formation of associates. Some results from this exploratory work will be discussed in this presentation.