

Steel making analysis and comparison with actual operation data

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UBE INDUSTRIES, LTD. and our group companies have many business fields that handle high temperature processes. Some of them are “Cement clinker manufacturing”, “Electric furnace steel manufacturing”, “Magnesia clinker manufacturing from sea water”, “Silicon nitride synthesized from Silicon tetra-Chloride and Ammonia”, etc.

Our group company, UBE STEELCO., LTD. has 60T-scale electric furnace for steel manufacturing. Unlike the blast furnace, steel scrap is used as a raw-material in the electric furnace. And also, main heat resource is electricity, CO₂ emission is fewer compared with the blast furnace.

In this study, we modeled and simulated the chemical phenomenon in the actual operation by FactSage to do various theoretical examinations. For example, new operation method, prior test of sub-material or troubleshooting. To build the model, we measured and analyzed the actual operation data. And we compared these data with calculation results. Almost of the behavior of chemical components behavior was satisfied. But, some components showed different results. These were components that behavior was influenced by the reaction of steel and slag-liquid interface such as Sulfur and Phosphorus. So, we figured out the reaction characteristics, and applied the calculation method considering the non-uniformity of furnace inside. As a result, reaction behavior between steel and slag-liquid were satisfied, and prediction accuracy of calculation improved greatly. By FactSage, the calculation method could be built that simulate the actual operation of steel-making process. In presentation, we are going to report the application examples of this method.