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# INFORMATION SUPPORT FOR SELECTION OF OPTIMAL SLAG MIXTURES FOR IRON AND STEEL REFINING

Stepanenko Dmytro, Togobitskaya Daria, Likhachev Jury
*Iron & Steel Institute NAS of Ukraine, Dnipro*

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Metallurgical slags are important for the smelting process of cast iron and steel. The theoretical and experimental study of the properties of slags and their systems will make it possible to reasonably choose the optimal compositions of mineral mixtures and secondary resources for their further use, in particular: slag mixtures for refining, slag mixtures for insulating and insulating the metal surface, mixtures for the continuous casting process, glass lubricants, etc.

The urgency of research is due to the war in Ukraine. Ukrainian industry, including metallurgical industry, is in a difficult situation, which is connected with the temporary loss of mineral and raw materials, as well as with the complexity of supplies of imported raw materials, all of which makes the cost of goods and services. Today it is important to address the issues of developing new materials and finding promising local raw materials for import substitution. This will make the work of the metallurgical enterprises of Ukraine stable and support the Ukrainian economy in the conditions of the military/post-war state.

The Iron & Steel Institute NAS of Ukraine has created and is constantly modernizing the database of experimental data «Slag» which contains data on the composition and properties of slag melts and oxide systems. The database is an information resource for theoretical and practical metallurgical processes [1]. At present, the "Slag" database contains more than 8000 different slag systems. An important technological property of slags is the viscosity which influences the processes in the "metal-slag" system.

We are constantly developing application software to simulate the structure of slag melts, forecast their properties and graphical service for the generation of triple and quadruple state diagrams. Software for generation of quadruple diagrams for $CaO$-$SiO_2$-$Al_2O_3$-$MgO$ (using programming language C#) has been developed. When graphically constructing a response surface ( in our case experimental viscosity data), the method of constructing a volumetric tetrahedron, projecting its planes into a two-dimensional plane gives a representation of the state diagram of a four-component system (fig. 1).

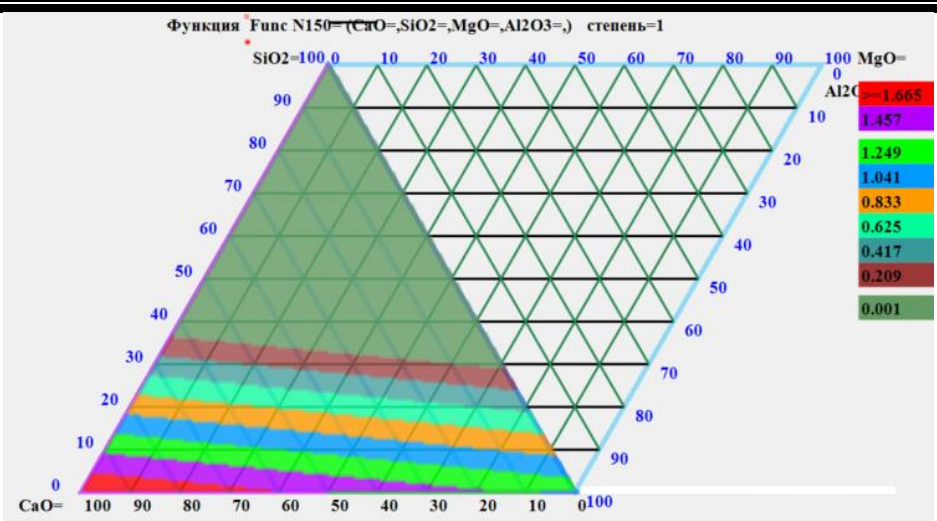


Figure 1 - Viscosity change diagram for $CaO$-$SiO_2$-$Al_2O_3$-$MgO$ at 1500°C

## Reference

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