



Valorization of Slags in the Pyrometallurgical Industry

By Michael Sudbury, José Palacios, Mario Sanchez

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Slags are produced in massive amounts by the pyrometallurgical processes in the ferrous and non-ferrous industries. Considered as a by product (waste?), large tonnages of slags have been historically accumulated close to the operating plants.

The slags contain various oxidized metals, and some of them are recovered as common practice these days. However, there are some minor valuable components which can be also recovered and recycled. Additionally, the remaining oxides in the slags show physical and chemical properties which allow this material to be considered for several industrial applications.

Thus, the slags can be valorised by the price of their minor components such as; copper, molybdenum, vanadium, and some precious metals, and by the iron oxides and silica which are present in larger quantities or by their bulk properties as industrial minerals.

Therefore, the scope of this course is to document the quantity of the various slags formed during the smelting processes and to relate their composition and molten structure with their physical-chemical properties. A description of the components present, their association and influence on the chemical and physical stability in the slags, is discussed. The importance of oxygen potential is emphasized. The various techniques for cooling slags are outlined and the influence of cooling rate on the properties of solid slag noted. The phases present in solid slags are described. The scale of production, chemical composition and current utilization of different slag types are also documented in this course.

The course aims to encourage the participants to see the slags not only as a by-product but also as a source of materials for new applications. Thus, some flow sheets to recover materials and make efficient use of slags will be proposed for discussion.

José Palacios, Mario Sanchez and Michael Sudbury, have considerable experience in slag treatment and metal recovery, and they will be happy to share this knowledge with the participants in this course.

Who Should Attend

This course would be beneficial to corporation and plant managers, engineers and technologists involved in the development of new approaches to by-products utilization. The course will also assist leaders of



operations interested in deriving revenue from material not being used today as well as people concerned with the environmental impact of the smelting process in ferrous and non ferrous plants. People interested in developing new businesses using by-products from established industry are also invited to participate. Knowledge gaps and current 'areas of ignorance' are flagged since these, if filled by appropriate research and development, may open up new, profitable and presently under-appreciated opportunities for marketing slags.

Course Outline

This Slag Valorization in Pyrometallurgical Industry course is designed to develop a better understanding of slag properties, characterization and its potential use both within the mining and metallurgical industry and in other industrial and commercial applications as a source of additional revenue.

Topics Include :

- Ferrous and non ferrous processes for slag generation
- General characterisation of pyrometallurgical processes
- Chemical and physical characterization of slags
- Valuable materials and elements contained in slags
- Current slag cleaning practices
- Proposed flow sheets to recover valuable materials and metals
- Alternative uses of slags. Case examples
- Knowledge gaps and potentially productive areas of investigation
- Recommended bibliography

The participants will also receive:

- ◆ CD with course material
- ◆ Certificate of completion
- ◆ A copy of instructor's recently published articles related to slag recovery and management
- ◆ Lunch and refreshments

REGISTRATION: <https://www.flogen.com/FraySymposium/registration.php>

