INVESTIGATION OF FLUXING IN A HIGH FERRIFEROUS LEAD SINTER’S BLAST FURNACE

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The CaO/SiO₂ ratio and the total iron content appear to be the most important factors in determining the lead content of the slag. This work presents the results of an investigation of the relationship between the slag composition and the lead content of the slag. The investigation comprised a series of trails with the operating furnace over the two years period.

Microscopic studies of sinter and slag were carried out to identify their material compositions.

The qualitative high ferriferrous leaden sinter, that satisfies the requirements of its next processing by using blast furnace smelting method, has been obtained. Typical assays of the high ferriferrous lead sinter, %: Pb = 36.1 ÷ 42.0; S = 2.05 ÷ 3.27; Fe ≈ 17.3; Cu = 2.0 ÷ 2.8; SiO₂ = 10.0 ÷ 12.0; CaO = 6.5 ÷ 7.5. We have determined the optimum composition of the high ferriferrous slag, %: Pb = 1.4 ÷ 1.8; ZnO = 12.0 ÷ 13.0; FeO = 38.4 ÷ 41.05; SiO₂ = 20.4 ÷ 24.12; CaO = 14.2 ÷ 15.0; CuO = 0.7 ÷ 1.0.

The mainstream flow diagram of that section of the smelter relevant to this paper is shown in fig [1]. The slag liquidus temperature is estimated to be about 1170⁰C.

Fig. Section of phase diagram for the CaO – SiO₂ – FeO – ZnO system. Points 1 and 2 represent compositions of slags in fluxing trails.

The result of this investigation indicates, that low lead losses in the slag can be achieved with good performance (55 ÷ 60 t/m² day) with a CaO/SiO₂ ratio and FeO concentration in the slag in the ranges 0,70 ÷ 0,74 and 38.4 ÷ 41.0 wt % respectively.

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