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著者	MARUYAMA Masuteru
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Effect of Oxygen on the Formation of Spheroidal Graphite in Cast Iron*

Masuteru MARUYAMA

The Research Institute for Iron, Steel and Other Metals

Abstract

In the cast iron melt the oxygen is present not only as dissolved gas but also as oxide; it is therefore very important to examine the behaviour of oxides in the melt. The investigation of the Ni-C alloy showed that the oxides SiO_2 or Al_2O_3 cause the precipitation of graphite in lamellar form. The thermodynamic study of the formation of SiO_2 on melting and solidification of cast iron was carried out. Hence it followed that for the production of spheroidal graphite cast iron it is advantageous to melt the metal with low silicon content together with carbon and to increase the silicon content in the melt at elevated temperature. By experimental results obtained on cast iron melted in vacuum where the formation of SiO_2 is smaller it was determined that the spheroidal graphite cannot be practically formed before the inoculation with ferro-silicon. On basis of all results an experiment was carried out for the practical production of cast iron with spheroidal graphite in a basic arc furnace of 50 kg and it was found that the spheroidal graphite cast iron can be produced by inoculation with ferro-silicon.

* The 1148th report of the Research Institute for Iron, Steel and Other Metals. Published in the 30 Internationaler Giesserei-Kongress, Kongressvorträge, Prag, 1963, p. 177.