

Thermodynamics of Composition Control of CaO-MnO-Al₂O₃-SiO₂ Inclusions in Tire Cord Steel

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The effect of oxide component content on the low melting point zone (simplified as LMP) in the CaO-MnO-Al₂O₃-SiO₂ system has been analysed by FactSage. The contents of [Si], [Mn], [O] and [Al] in liquid steel which are in equilibrium with the LMP inclusions in the CaO-MnO-Al₂O₃-SiO₂ system have been calculated. The results show that the CaO-MnO-Al₂O₃-SiO₂ system has the largest LMP zone (below 1400°C) when the Al₂O₃ content is 20% or the CaO content is 15%, and that the LMP zone becomes wider with increase in SiO₂ and MnO contents (within the range of 0~25%). To obtain LMP inclusions (below 1400°C), [Si] and [Mn] can be controlled within a wide range, but [Al] and [O] must be controlled within the range of 0.5~5 ppm and 50~120 ppm, respectively.

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