# Effect of Sb addition on oxidation characteristics of 65Mn steel

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**Abstract** 65Mn steel is widely used, and its composition design is characterized by a high content of C and Mn, supplemented by a certain amount of Si element. In the process of hot rolling production, the oxidation burning loss of this steel is too large and the phenomenon of scale pressing is relatively serious. In this paper, the effect of Sb addition on the oxidation characteristics of 65Mn was innovatively analyzed. Continuous oxidation and isothermal oxidation experiments were carried out by thermogravimetry, and the characteristics of scale interface and Sb enrichment were observed by means of electron microscopy and electron probe. It was found that the addition of Sb element significantly inhibited the total oxidation weight gain of 65Mn steel, and the peak of the oxidation weight gain rate shifted to high temperature. After the addition of Sb, the flatness of the high-temperature oxidation interface increased significantly.Interface fluctuation decreased from 1.85 without Sb to 1.33 with Sb-0.21%. It was found that Sb element can increase the oxidation free energy of steel by using 700-900℃ isothermal oxidation experiment. The addition of Sb element is more beneficial to increase the oxidation resistance of steel under high temperature conditions, which is mainly because the surface enrichment of Sb element on interface that inhibits the outward diffusion rate of iron ions, and on the other hand prevents the liquefaction of high temperature fayalite phase into the matrix which accelerates the oxidation.The increase of Sb element can reduce the thickness of the scale during the hot rolling process, reduce the oxidation loss and improve the surface quality of the hot coil. However, after the precipitation of Sb element reaches solid solubility, it is easy to cause surface quality problems during continuous casting or hot rolling.

**Keywords** scale; 65Mn;Sb element; isothermal oxidation; hot rolling surface quality control

## Reference

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