Effect of Boron on the Surface Tension of Liquid Iron

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Boron as alloying element is widely used for hot formed metal sheet production. Literature data on the influence of boron on the surface tension of the iron alloys varies significantly from a negative to positive effect. Most of the previously reported experiments were conducted with the use of the sessile drop technique whose accuracy seriously depends on proper atmosphere control, size of the sample, and evaporation of elements from the drop surface. The present work reports results of experiments on the effect of boron on the surface tension of de-oxidized electrolytic iron and ARMCO iron with the presence of a surface-active element - sulfur. Measurement of the surface tension was conducted with the use of a maximum bubble pressure technique in the temperature range of 1550-1650 °C. The samples were molten in a ZrO₂ crucible and ZrO₂ capillaries were used to blow argon into the liquid iron.