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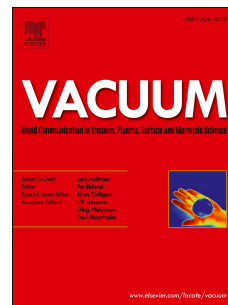
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Preparation of High Purity Zinc from Zinc Oxide Ore by Vacuum Carbothermic Reduction¹

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Abstract: Effects of the yield and quality of Zn were investigated by vacuum carbothermic reduction from zinc oxide ore. Results indicate that initial moles ratio of C/Zn_{Total}, pressure of system, reaction time affect significantly the Zn yield from zinc oxide ore, while sintering temperature and sintering time have important influences on the quality of Zn. The optimal operating conditions are obtained as follows: the sintering temperature 973 K, the sintering time 50 mins, the molar ratio of C/Zn_{Total} 2.5, the reaction temperature 1173 K, the pressure system lower than 20 kPa, the reaction time 50 mins. Under the optimal conditions, the yield and purity of Zn are more than 95% and 99.995% respectively, suggesting the vacuum carbothermic reduction is a promising method to extract high-purity zinc from zinc oxide ore.

Keywords: Vacuum; Carbothermic reduction; Zinc oxide ore; Zinc yield; High-purity zinc; Metallurgy

1 Introduction

With the expanding of the application scope of zinc, zinc consumption increases rapidly, resulting in a shortage of zinc sulphide increasingly. Therefore, how to develop and utilize zinc

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