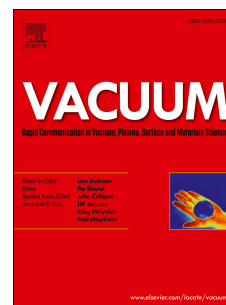


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Determination and Controlling of Crystal Growth Rate during Silicon Purification by Directional Solidification

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Abstract

A theoretical model for investigating the crystal growth rate and the solidified height during silicon purification by directional solidification is proposed. The growth rate is not constant usually and it has profound effects on the distribution of metal impurity in production process. The crystal growth rate and the solidified height, based on thermal equilibrium on the melt-crystal interface, were discussed. The relationship between the surface temperature of silicon melt (T_1) and temperature of graphite heater (TC_1) was found. The result shows that the value of T_1 has an approximate linear relationship with the TC_1 . The theoretical model can be used to design or predict the crystal growth rate by controlling the TC_1 according to the different request. Then, the distribution of metal impurity during silicon purification by directional solidification can be calculated according to the crystal growth rate. Thus, the theoretical model can be used to design the growth rate and predict the distribution of impurity to the silicon purification process by directional solidification. The experiments proved that the calculation agreed well with the existing experimental results.

Keywords: Purifying Silicon, Directional Solidification, Crystal Growth Rate

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