Control of Microstructure and Crack in Polycrystalline Silicon Ingot using Simulation Method

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It is important to control the microstructure and crack during the continuous casting of silicon ingot because these factors affect the purity and yield of casted silicon ingot. For this reason, we tried to predict the temperature gradient, stress distribution and solidification behavior of the ingot in various process condition by using simulation method. The accuracy of simulation was verified by comparing the microstructure of the simulation result and actual casted silicon ingot under the same process conditions. Finally, the temperature gradient, stress distribution and solidification behavior were analyzed in various process conditions such as growth rate, power, and silicon molten level by using the simulation method, and it can be confirmed the optimal process condition for casting the high purity silicon ingot with high yield.