

ABSTRACT

A crystal growth method for fabricating a large-diameter silicon single crystal, a system, a silicon single crystal, and a medium are provided. The method includes: performing global two-dimensional simulation on a crystal growth process, and obtaining global temperature distribution, velocity field distribution and an initial solid-liquid interface value in the crystal growth process with a predetermined crystal growth device model and a predetermined crystal growth parameter; determining a boundary condition based on the global temperature distribution and the velocity field distribution, and performing local three-dimensional simulation on the crystal growth process based on the boundary condition to determine a target solid-liquid interface value; adjusting the predetermined crystal growth parameter until the initial solid-liquid interface value is equal to the target solid-liquid interface value within a threshold range, and taking the adjusted predetermined crystal growth parameter as a reference crystal growth parameter; calculating a simulated defect in the crystal growth process based on the reference crystal growth parameter; iteratively optimizing the reference crystal growth parameter based on the simulated defect until the simulated defect meets a predetermined condition, and taking the optimized reference crystal growth parameter as a target crystal growth parameter; and fabricating a defect-free silicon single crystal.

(Figure 1)