Chapter 7

Scope of Future Work

Growth of industrial scale silicon crystal using Czochralski method is a multi-disciplinary problem involving numerous controlling parameters. Simulation is presently an indispensable tool for investigation of Czochralski process and is likely to be so in the coming decades. Owing to improved models that capture the multi-disciplinary physics as well as development in computational power, today it is possible to carry out numerical simulations that reflect crystal growth scenario in an actual industrial scale Czochralski growth setup.

Numerical results presented in current work, though relating closely to physics and operational parameters in an actual Czochralski set up, are limited to two dimensional axis symmetric simulations owing to want of high speed computational facilities. The investigation can be extended to incorporate three dimensional effects within the crucible melt.

Optimization of different growth parameters which ultimately govern the quality of the crystal is an area that is going to be at forefront in research related to Czochralski method. Methodology, mathematical model and simulation results presented in current work can be further extended to determine optimal crystal growth parameters leading to growth of silicon crystal having desired concentrations and distribution of oxygen species.