

## Abstract :

A numerical study on the free surface of silicon melt in CZ growth is conducted. The free surface shape has not been studied before to our best knowledge. A set of numerical computations are conducted using the finite volume method. The time-dependent VOF formulation is used to track the shape of the free surface and the flow field inside the silicon crucible. The VOF formulation relies on the fact that two fluids (liquid silicon and argon gas) are not interpenetrating. the volume fraction is introduced as a new variable of the phase in the computational cell. In each control volume the volume fractions of all phases sum to unity. The fields for all variables and properties are shared by the phases and represent volume-averaged values, as long as the volume fraction of each of the phases is known at each location.