Characterizing multicrystalline silicon ingots
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INTRODUCTION
One of the main challenges in the production of multicrystalline ingots is the control of crystal quality which is strongly related with the solidification interface shapes.

Non-planar solidification interface shapes influence:
- non-uniform net dopant density distribution
- metallic impurity segregation
- columnar grain growth

Some conventional measuring methods include X-ray topography, ultrasound imaging or camera attached to a transparent furnace.

The goal of this work is to introduce a new method which enables the 3D estimation of solidification interface geometry along the ingot height.

PROCEDURE

MATERIAL USED:
Compensated multicrystalline
(Image taken from Btimaging)

PROCEEDURE:

1. PL imaging
2. Calibration
3. Conversion based on Scheil’s law

PL MEASUREMENTS & CALIBRATION

RESULTS

FURTHER OBSERVATIONS

CONCLUSIONS

A method for estimating solidification interface shapes is presented

Steps involves
1. PL imaging
2. Calibration
3. Conversion based on Scheil’s law

This method is useful for estimating concave/convex geometry of solid front and homogeneity of temperature field in the system. It is applicable to monocrystalline, compensated or non-compensated multicrystalline ingots.

REFERENCES

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