GEMINI – Grain Analysis
Multi- and Mono-like Wafer Characterization

Intego
Vision Systeme

Area of Application

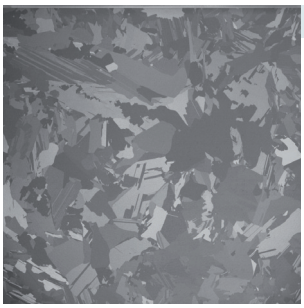
For a wafer dependent process management and a statistical process optimization in the manufacturing of solar wafers and cells it is reasonable to analyse the grain structure of multicrystalline and mono-like wafers.

The **GEMINI grain analysis system** is able to extract from the natural grain structure of wafers several data, e.g.:

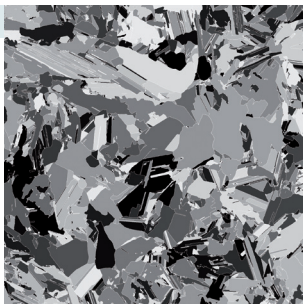
- Number of grains and size of each grain
- Overall length of grain boundaries
- Recognition of twin grains
- Percentage of area of largest grain

The system is available as a stand alone machine for measurements of wafers in a laboratory environment and also as inline tool e.g. for quick mono-like characterization.

For the stand alone tool, a single wafer is manually inserted into the loading position of the system. After the images of the wafer are acquired, the wafer can be manually unloaded from the loading position. It has a measurement time of 10 seconds. The inline system inspects the wafers during motion and has a cycle time down to 1s per wafer (depending on depth of analysis). It can be integrated easily to existing production lines.



Original image of wafer.



Extracted grains of wafer.

Technical Data

The **GEMINI grain analysis system** acquires multiple images of one wafer. This is necessary to get reliable results of the grain structure on the wafer. Only in using different illuminations for one wafer it is possible to make every single grain visible. From the image, the grains are extracted and characteristic features are stored in the internal database.

The database can be connected via TCP/IP interface to the MES; communication to an existing automation is also available, e.g. EtherCAT or Profibus.

Left:
Stand alone tool with drawer loading.

Right:
Inline system integrated into a belt module.

Customer's Benefits

Improve quality:

- Increase quality and efficiency of cells by easy process optimization
- Improve your crystallization process

Gain additional benefits:

- In combination with GEMINI Block Reconstruction System: Analyse correlation of grain characteristics and original height of wafer in its correlated brick.
- In combination with GEMINI Tracking System: Analyse the efficiency of cells in correlation to the grain structure of the wafers.
- Decide quick & inline how to process a mono-like wafer.

Twin grain recognition:
Several parameters for twin grain detection are available. In this case the detected twins are marked green.

Contact

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