

MULTICRYSTALLINE SILICON

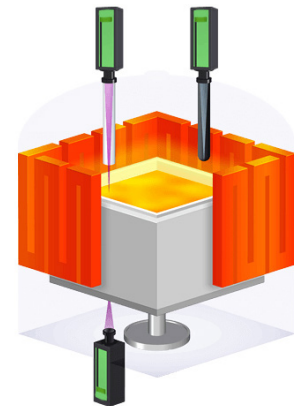
THE OPPORTUNITY

Multicrystalline silicon solar panels dominate the photovoltaic market, so multicrystalline silicon grown by the directional solidification method is one of the most prevalent materials in the photovoltaic market.

Seed-assisted growth such as Quasi-Mono and high performance multicrystalline silicon also looks promising. All of these processes require good temperature control.

Ideally, the temperature distribution inside the silicon is of high interest but not very practical. The top surface of the silicon is typically measured but the stray radiation from the heaters can affect the measurement.

In the seed-assisted growth, the bottom of the crucible is typically measured. It is desired to measure through the crucible as close as possible to the bottom layer temperature where seed/seeds are placed. Because the crucible is typically made of quartz and coated with Si_3N_4 , a good understanding of the optical properties of the quartz and the Si_3N_4 is required.



OUR SOLUTIONS

Measurement Inside a Closed-End Tube

The pyrometer measures the very bottom tip of the blind tube, which reaches thermal equilibrium with the environment inside the furnace.



Impac ISR 6 Advanced

Measurement Through an Open-End Tube Onto the Molten Silicon

Carefully designed optics minimize the effect of the heaters, so the temperature reading would not be strongly related to that of the top heater.

Measurement Through an Open-End Tube Onto the Molten Silicon

The Advanced Energy pyrometer is optimized to measure as close as possible to the seed layer.



Mikron PhotriX series

Pyrometer Options

- ISR 6 Advanced
- IS 310
- Photrix Series

YOUR BENEFITS

- Enhanced yield
- Better quality



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