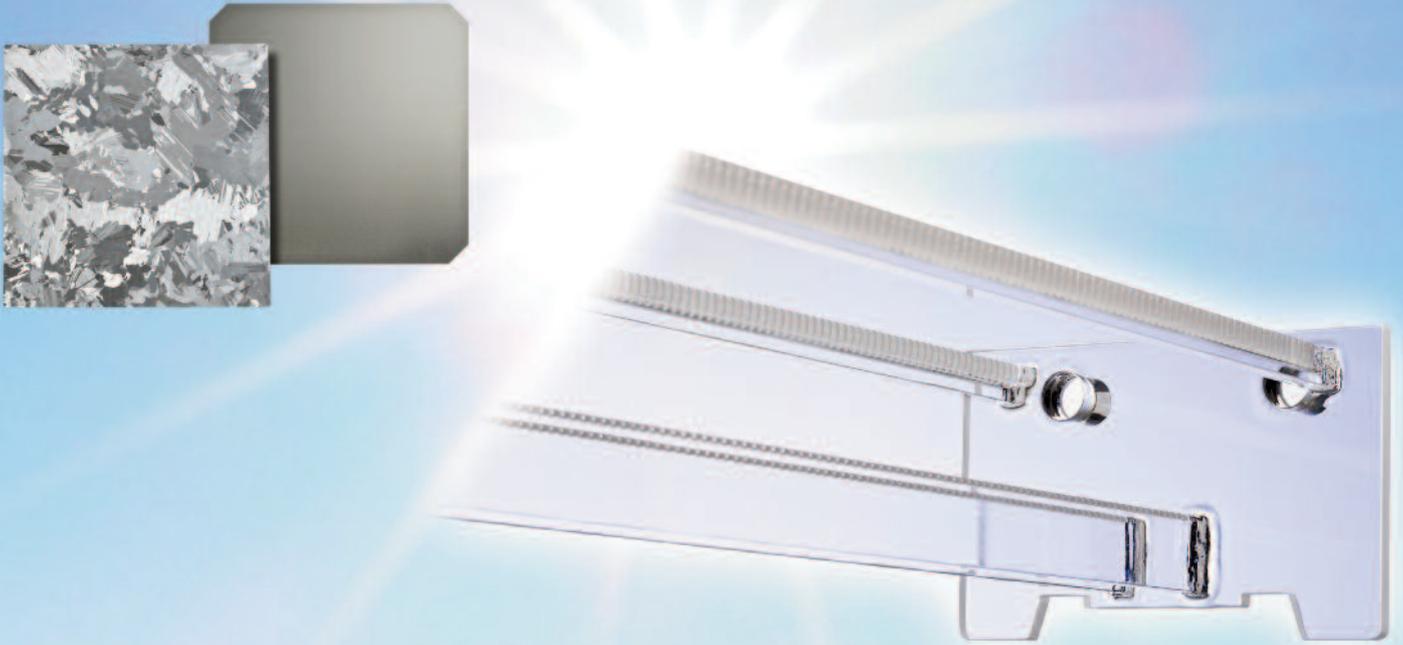


Heraeus



**Fabricated Quartzware
for the Photovoltaic Industry**

Heraeus Quarzglas supports Photovoltaic Technologies

■ Enabling Technologies:

Process Tubes, Carriers, Accessories for use in High-Temperature Processing of 1st and 2nd Generation Solar Cells and Panels

■ Focusing on Cost of Ownership:

Quartz Design and Engineering Support for Various Applications in the Photovoltaic Value Chain

■ Supporting the Quartz Life-Cycle:

Cleaning, Repair, Refurbishment of Quartzware



Enabling Technologies:

Due to its unique properties, quartz glass is an irreplaceable material for many processes within the semiconductor and photovoltaic industries. These properties include: excellent temperature resistance up to 1300° (short-term) as well as high thermal shock resistance, a low thermal expansion coefficient, extraordinary chemical purity, high corrosion resistance and optical transparency between 160 nm and 4000 nm wavelength.

Quartz glass products are used particularly in high temperature applications such as diffusion processes. In these processes, quartz glass is the only material in contact with the valuable substrates.

Among our products for the photovoltaic industry are various kinds of customized fabricated quartzware including:

- Tube-based process and reaction chambers
- Wafer boats and carriers
- Additional accessories for furnace equipment

Furthermore, we offer customized developments, e. g. extra-large quartz tubes up to a diameter of 900 mm or large plates (sizes available on request). We support our customers with individual innovations such as special surface treatments or Heraeus Reflective Coating (HRC®).

Focusing on Cost of Ownership

Appropriately designed quartzware has a major impact on performance and yield during cell production. Designs should be optimized for ease of handling during installation and use. The optimization at the design stage influences the Cost of Ownership of quartzware significantly. Heraeus can provide a great depth of knowledge to optimize your designs.

We offer design and engineering support from the first step. Close cooperation, e.g. workshops between quartz experts and equipment designers is our standard. Quartz innovations like HRC® are useful in optimizing high-temperature systems and therefore can reduce energy consumption.

Supporting the Quartz Life-Cycle

Customized quartz products are valuable elements within the photovoltaic production chain. To optimize the cost of ownership, we offer repair services as well as cleaning and refurbishing processes depending on our customer needs. Additional contact information of our Joint Venture companies is available at www.fabrication.heraeus-quarzglas.com.

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