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Light Weight Optical Mirrors Formed In Single Crystal Substrate

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DESCRIPTION

This invention is directed to a process for manufacturing a lightweight mirror from a single crystal material, such as single crystal silicon. As a near perfect single crystal material, single crystal silicon has much lower internal stress than a conventional material. This means much less distortion of the optical surface during the light weighting process. After being ground and polished, a single crystal silicon mirror is light weighted by removing material from the back side using ultrasonic machining. After the light weighting process, the single crystal silicon mirror may be used as-is or further figured by conventional polishing or ion milling, depending on the application and the operating wavelength.

FEATURES AND BENEFITS

- The substrate material is removed from one surface of the substrate after polishing another surface of the substrate to the predetermined optical figure, thus reducing weight of the substrate, and hence facilitating a lightweight optical mirror from the single crystal substrate.
- The method avoids print-through and other effects caused by working on the light weighted optical blank. The method allows minimal distortion of the optical surface.

APPLICATIONS

- Space-based Imaging Systems
- Military Reconnaissance
- Fast-Scanning or Steering Mirrors

FOR MORE INFORMATION

If you are interested in more information or want to pursue transfer of this technology, GSC-14393-1, please contact:

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