

ENHANCED LIGHT ABSORPTION OF SOLAR CELLS AND PHOTODETECTORS BY DIFFRACTION

US Pat. No.: 6,858,462

Technology Readiness Level: 5

Key elements of the technology have been proven to work as expected in the laboratory environment

The solar and photovoltaic industry has grown steadily over the last several years. In order to maintain these growth rates, the processes and methods need to be continuously improved. Sandia National Laboratories has created a method for enhanced light absorption of solar cells and photodetectors in a narrowband or wideband spectral absorption.

Enhanced absorption is achieved by utilizing a front-surface grating structure on the surface of the solar cell or photodetector. This generates high diffraction order when light is present. The majority of the light energy is then distributed into higher diffraction orders and absorption is increased.



TECHNICAL BENEFITS

- Improved performance of thin-film solar cells, space solar cells, and wavelength selective photodetectors
- Enhanced light absorption of solar cells and photodetectors by diffraction
- Improves light absorption without affecting the surface passivation

INDUSTRIES & APPLICATIONS

- Solar & renewable energy
- Photovoltaic
- Thin-film solar cells
- Space solar cells
- Polarization-dependent photodetectors