Sandia National Laboratories

Diffraction: Enhanced Light Absorption of Solar Cells and Photodetectors

POTENTIAL MARKET APPLICATIONS

Solar and Renewable Energy

Photovoltaic

Thin-film Solar Cells

Space Solar Cells

Polarization-Dependent Photodetectors

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

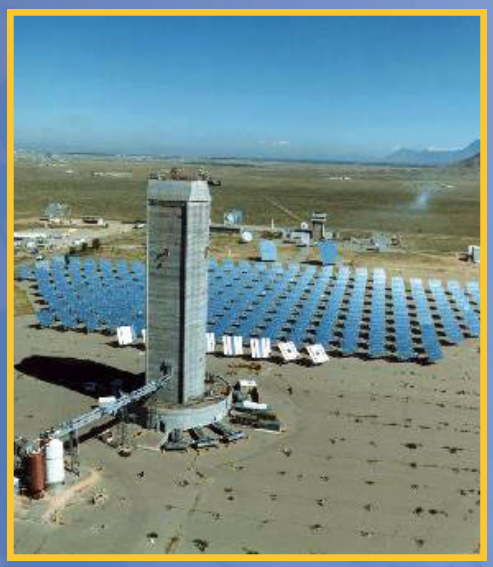
INTELLECTUAL PROPERTY

US PATENT #6,858,462
SD# 6402

TECHNOLOGY SUMMARY

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.



TECHNOLOGY READINESS LEVEL

Sandia estimates this technology at approximately TRL 5. Key elements have been demonstrated in relevant environments.

Bianca Thayer | 505.284.7766 | bkthaye@sandia.gov

HTTPS://IP.SANDIA.GOV

National Nuclear Security Administration

Sandia National Laboratories

Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration.
SAND # 2011-6351P