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ELOBARATION OF EFFECTIVE ANTIREFLECTION COVERINGS FOR MODULES OF SOLAR PHOTOCONERTERS

Lytkina. L.

As we know from the literature, photoelectric converters or solar cells (solar cells) - are semiconductor products,that converts sunlight into electricity. There are different manufacture of solar cells, the design of which differs from both the physical principles of conversion of solar radiation into electricity, and less important details. Most effective in terms of energy, devices for converting solar energy into electricity are semiconductor photovoltaic cells (solar cells), since it is a direct, one-step conversion of energy. Today the market of commercial systems for terrestrial applications are most noticeable crystalline silicon (about 80-85% of the world market) and thin-film solar cells (about 10% of the market).

The history of the solar cell, also known as a photovoltaic cell, can be traced all the way back to 1839 when the then nineteen-year-old French physicist Antoine-César Becquerel first discovered the photovoltaic effect. While experimenting with electrolytic cells containing two different metal electrodes in a solution, he found that some combinations of metal and solution would produce a small current when exposed to light. The first actual solar cell was built in 1877 by Charles Fritts. He applied a very thin gold film to a piece of selenium. Although this cell operated with less than one percent efficiency, it was able to produce a measurable amount of power. A similar cell was constructed in 1927 consisting of a copper film on piece of copper oxide. This cell also operated with less than 1% efficiency.

The next breakthrough came in 1941 when Russell Ohl built the first silicon solar cell. In 1954, Pearson, Chapin, and Fuller expanded on this design and were able to build a silicon cell with an efficiency of 6%. Since that time, there has been a great deal of progress in solar cell design.

There are many factors that can be changed to help improve the efficiency of solar cells.

An untreated solar cell can reflect as much as 36% of the incident light.

Anti-reflective coatings such as silicon nitride can reduce the reflectivity of the cell to as low 5%. In addition to adding antireflective coatings, texturing the cell surface also reduces the amount of light reflected at the surface of the cell. This cell was able to operate at 24% efficiency which is very high for a silicon cell. The inverted pyramids labeled in the figure are at such an angle so that light that is reflected from the surface of the cell, is reflected in such a way that it will hit one of the other pyramids where it may be absorbed . The high absorption of this cell led to its record setting efficiency.