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Improved Cover for Cadmium Sulfide Solar Cells

Cadmium sulfide film solar cells are fabricated with a cover to protect them from environmental conditions of earth (humidity) and space (electron and proton radiation). Experiments have shown that thin film cadmium sulfide cells protected by a one-mil thickness of Teflon* FEP material will produce up to 30 percent more power than similar cells with conventional Kapton* covers.

Thin-film cadmium sulfide solar cells are presently constructed with a one-mil sheet of Kapton plastic as the top cover. This cover must not only transmit the solar energy in the wavelength region where the solar cell is sensitive, but also must be resistant to the hostile conditions of space. Kapton has been the best plastic material for this purpose because it does not degrade significantly when exposed to expected doses of ultraviolet light and electron and proton radiation. However, due to its structure, the transmission of usable solar energy is only about 66 percent. A one-mil thickness of Teflon FEP material transmits approximately 95 percent of the usable solar energy, and is also more resistant than Kapton to ultraviolet light and electron and proton radiation.

The Teflon FEP material can be bonded directly or with suitable adhesives to the top surface of the cell. If adhesives are used, they must be resistant to the ultraviolet light passing through the transparent cover; otherwise, protective coatings must be used to eliminate the effects of harmful radiation.

Notes:

1. The Teflon FEP can be used not only on the evaporated cadmium sulfide cells, but also on cad-

mium sulfide and other semiconductor solar cells made by a variety of methods, including spraying processes, pressed powder, and single crystals.

2. The following documentation may be obtained from:
Clearinghouse for Federal Scientific
and Technical Information
Springfield, Virginia 22151
Single document price \$3.00
(or microfiche \$0.65)

Reference:

NASA-TM-X-1905 (N69-40339), Transmission Effects on Plastic Films Irradiated with Ultraviolet Light, Electrons and Protons

3. Technical questions may be directed to:
Technology Utilization Officer
Lewis Research Center
21000 Brookpark Road
Cleveland, Ohio 44135
Reference: B70-10584

Patent status:

This invention is owned by NASA, and a patent application has been filed. Royalty-free, nonexclusive licenses for its commercial use will be granted by NASA. Inquiries concerning license rights should be made to NASA, Code GP, Washington, D.C. 20546.

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