



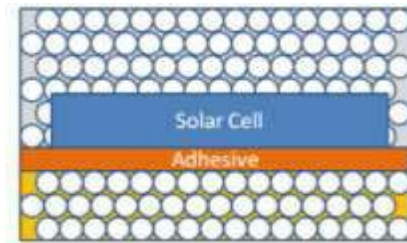
Pseudomorphic Glass for Space Solar Cells

Patent No. 8,974,899

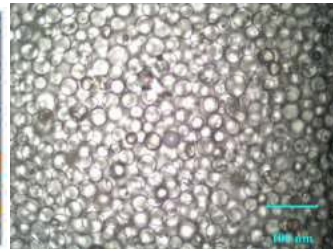
Inventor: David Wilt

Background: Traditional space solar arrays generally consist of solar cells bonded to rigid panel substrates and covered with ceria-doped borosilicate microsheets of glass. Although coverglass materials have worked satisfactorily for existing solar cell technologies, their cost, fragility, and lack of complete encapsulation (the metal cell to cell interconnects are not covered by the coverglass) have led many organizations to search for a simpler alternative.

Technology Description: AFRL has developed a flexible coverglass alternative for spacecraft solar panels that increase efficiency and UV transmittance when compared with conventional materials. The coverglass is composed of small beads of either fused silica or ceria-doped borosilicate glass embedded in a matrix of conventional coverglass adhesives. These beads may also be used in a matrix of Kapton as the solar panel's substrate which may be combined with flexible solar cells to form flexible solar panels.



Conceptual design of a flexible solar array blanket incorporating Pseudomorphic Glass coatings



Optical micrograph of 5mm thick ceria doped borosilicate glass with 20-40 micron diameter beads



Photo of a 5mil PMG sheet

Market Applications:

- Flexible spacecraft solar arrays
- Large area Optical Solar Reflectors (OSR) for spacecraft thermal control

Key Advantages:

- Protective – demonstrated electron, proton and UV protection
- High emittance – cells can operate ~5°C cooler, thus 0.5% (abs) more efficient
- Full encapsulation – potential to mitigate ESD damage (\$4B in spacecraft losses due to ESD in past 20 years)
- Potential for ESD control with conductive adhesive additive
- Higher UV transmittance for next gen PV technologies

For information about this technology, please contact Matt O'Brien from our Tech Engagement Team at: 505-846-5028 matto@afrlnewmexico.com