Polymers in Photovoltaics

The solar power market has been growing rapidly in the past decade, driven by the need to find alternative energy sources. Photovoltaic technology has the potential to turn barren desert into high value power plants, rooftops into income, and to generate electricity in remote locations. However, the manufacturing costs of modules in $/Watt are still too high and hence markets have been growing most in regions with subsidies or favourable tariffs for electricity purchase.

As technology develops to reduce costs and improve conversion efficiency, new materials are being tested for module and related components with durability and long-term performance as critical measures. Photovoltaic systems are exposed to extremes of weather including cold, heat, moisture and UV radiation. Polymers are used in many components including encapsulants, backing sheets, frames, sealants and adhesives, thin film substrates, glazing, fresnel lenses for concentrated solar photovoltaics, photoactive components in organic photovoltaics, cable insulation and connectors. These materials can offer direct benefits in terms of performance and overall economics including assembly and mounting, as well as increased flexibility for applications such as building integrated photovoltaics and portable solar cells for charging electrical devices.

AMI is bringing together module manufacturers and polymer experts at an international conference focused on Polymers in Photovoltaics, which takes place from 20-22 April 2010 at the Maritim Hotel in Cologne, Germany. The opening presentation is from BP Solar, one of the top companies in solar power worldwide with an active role in new manufacturing developments. There are performance requirements for polymers in photovoltaics, with TÜV Rheinland taking a lead in certification in Europe and the Underwriters Laboratories with directories of approved components for North America.

High performance polymers are being used as substrates including polyimides from Nexolve, which are also being tested as cover glass replacements. Another versatile polymer is PMMA from Evonik Degussa, with applications in glazing, concentrated photovoltaics (using lenses to focus the light) and as an encapsulant for thin films.

Several materials are in use as encapsulants including PVB from Solutia, EVA from Lanxess Deutschland and silicone from Dow Corning. Comparative studies have been carried out by companies such as Specialized Technology Resources (STR). Sealants and adhesives play a critical role in integrity and there are specialists in this field such as Koemmerling Chemische Fabrik, and Henkel with electrically conductive adhesives. 3S Swiss Solar Systems specializes in production technology and has looked at the use of polymers in lamination of multicrystalline and thin film photovoltaics.

Modules are protected by back sheets from companies such as Krempel, which supply a range of products. Fluoropolymers are used here, often in layers with other polymers; suppliers include Arkema, DuPont and Saint-

Gobain Performance Plastics. Polyester is available from DuPont Teijin Films and is also finding use as a substrate. The supportive frame of modules is traditionally made of metal. However, BASF has developed polyurethane frames with module manufacturers, with cost benefits overall.

Crystalsol is developing single crystal/polymer composite solar cells.

Cables for photovoltaics are subject to heat and UV irradiation, so this is a very specialist field. PolyOne has produced compound which meets the certification standards, while Kemmler Consulting is studying the differences in polymer in this type of cable.

Polymers in Photovoltaics 2010 brings together photovoltaic module and component manufacturers, researchers and test institutes, together with suppliers to the industry, and end users. This event provides a unique opportunity to network with top experts and examine photovoltaic manufacturing innovations and challenges.

Contact for further information:
Dr Sally Humphreys
Business Development Manager
Applied Market Information Ltd, AMI House, 45-47 Stokes Croft, Bristol, BS1 3QP, UK
Tel: +44 117 924 9442 Fax: +44 (0) 117 311 1534
Email: sh@amiplastics.com
Web site: www.amiconferences.com
Conference web site:
http://www2.amiplastics.com/Events/Event.aspx?code=C334&sec=859