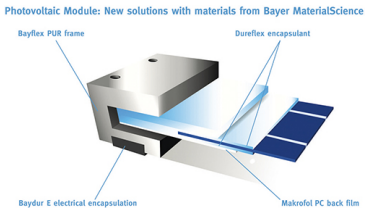
Fachverlag für die Polymerindustrie

Bayer MaterialScience: “From Megatrends to Business”

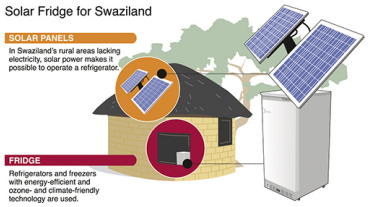
Bayer MaterialScience (BMS) is committed to help meet the global challenges of energy shortages and climate change through innovative and sustainable technologies and processes. This is the company’s central message at K 2010. Under the motto “From Megatrends to Business”, the company will showcase polymer materials solutions and developments in the areas of climate, technology, mobility, living and health.



Photovoltaic module based on BMS materials

"This company alone cannot solve problems associated with these matters, but it does have sustainable solutions in the form of innovative products, processes and applications that exist today or are being developed for tomorrow", explained Patrick Thomas, CEO at a recent pre-K event. "Today, buildings are responsible for about 30 % of global greenhouse gas emissions and more than 40 % of global energy use. So the need for renewable forms of energy is clear", he continued. He went on to explain that over 14 % of all greenhouse gases worldwide are generated by the transport sector. "Lightweight composites can cut a vehicle's weight by up to 30 %", he said. "We are already supplying polyurethane composites as replacements for the metal roofs of cars, and we are beginning to supply polycarbonate glazing components as a substitute for glass. Replacing very energy-intensive steel and glass components in vehicles with polymers can offer significant energy reduction potential."

Power, heating and cooling



Palfridge Ltd., based in Swaziland, manufactures appliances with very thick-walled insulation made of rigid polyurethane foam based on raw materials from BMS

Giving further examples, he said traditional light bulbs have a light efficiency of 3 % compared with up to 80 % for LEDs, and although there were challenges in manufacturing LEDs and managing their light, polycarbonate resin is one of the few materials that can withstand their high temperatures.

Materials from BMS, namely rigid PU foam insulation, also play an important role in reducing wastage in crop storage and the cool chain: Up to 50 % of food produced in developing counties is wasted between production and consumption.

The company has developed second-generation thin-film solar cells that support the production of flexible photovoltaic modules. **Makrofol** PC films and **Platilon** TPU films are used in the process and with sheets made of **Makrolon** solar modules can be integrated directly in transparent roof structures. Already on the market is the award-winning **Solon Black 160/05** in-roof module, which is equipped with an 'intelligent' frame and an integrated mounting system made of **Bayflex** PU foam. A new, modular solar thermal energy system engineered by BMS and partners combines a heat-generating solar air collector with an optimised thermal insulation system. The solar air collectors are constructed from multi-wall sheets made of a newly-developed, high temperature-resistant grade of Makrolon, and are installed on roof tiles.

Products from BMS are also set to become integral components of wind turbines, where the adhesives used to bond the blades are increasingly polyurethane-based instead of epoxy. Carbon nanotubes can also be incorporated into the epoxy resins to reduce the weight of the blades. Currently, wind turbines can only be operated stably with rotor blades of up to 60 m in length. More electrical energy could be obtained using even longer blades. **Baytubes** carbon nanotubes are significantly stronger than steel, but so light that they are ideally-suited for manufacturing longer rotor blades, for example in combination with epoxy resins. The **Multitec** PU spray system is an economical solution for manufacturing the housings of wind turbine nacelles. To protect wind turbines from corrosion, BMS has also developed special eco-friendly and economical coating raw materials based on polyaspartics.

Solar-powered refrigerators for Swaziland

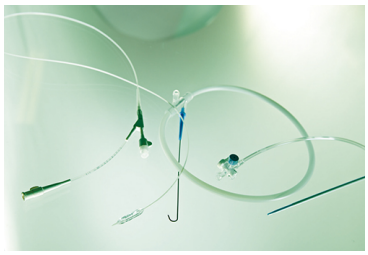
Swaziland is one of the world's poorest countries. The rural economy and climate mean that food preservation is difficult. High temperatures and inadequate electricity means that communal refrigerating appliances can only be used to a limited extent.

Palfridge Ltd., a BMS customer and manufacturer of refrigerators, based in Swaziland has developed an eco-friendly solution. The Palfridge appliances have an insulating layer of rigid PU foam, 10 cm thick. This keeps the contents cool for up to five days without electricity – even at external temperatures of over 40 °C. In addition, some of the company's product lines are also equipped with two 90 W solar modules. Long-term refrigeration of both food and medicines is essential to many people's survival in Swaziland. More than 25 % of the population is HIV positive – one of the highest rates anywhere in the world – and therefore dependent on drugs that need to be stored in a cool place, drugs to treat malaria need similar storage. The manufacturer also uses hydrocarbon refrigerants thus reducing emissions of fluorine gases and the subsequent global warming effect. The project was financed under the Proklima programme of the **Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH.**

PU, an innovative healthcare material

Through the supply of PU and thermoplastic materials and films to manufacturers of medical products, the company is contributing to developments in medical technology. These applications range from highly functional coatings and special-purpose adhesives and plasters for wound dressings to thermoplastics for surgical and diagnostic instruments.

With two new developments, BMS is extending its medical technology portfolio, now marketed under the name **Baymedix.** The first is a new lubricious coating for use on catheters and other medical products. With exceptional surface slip characteristics as well as high resistance and biocompatibility, the **Baymedix CL 100** coating can be used wherever the physician needs to reduce the amount of friction between components of a medical product.



Baymedix CL 100 is especially suitable for cardiovascular catheters

A second development is the PU-based coating **Baymedix CD,** which can release a drug over a pre-determined time. For a range of active ingredients – low molecular weight drugs and biopharmaceuticals – this time can be varied from a few hours to several months. The release of the drug is guided by a specific ratio of hydrophilic to hydrophobic components in the coating.

BMS is also developing **Baymedix FG** foams for wound dressings and the **Baymedix AT** topical tissue adhesives. These products represent an alternative to stitching materials for closing wounds.

With all these and more material innovations, BMS aims to help design professionals to create more efficient and effective ways of solving the problems of every day living.

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