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lisicon®

EMD PERFORMANCE MATERIALS

Materials for organic photovoltaics

Printing the Future

EMD Performance Materials is a business of
Merck KGaA, Darmstadt, Germany

capturing the sun

Organic photovoltaics (OPV) constitute an important and highly promising technology in the world-wide adoption and implementation of Photovoltaics (PV).

In particular, printable OPV materials can be processed using high speed continuous production (roll to roll) without the need for vacuum processes, greatly enhancing throughput without the need for high capital investments. These factors all combine to provide OPV the potential for very low energy payback time.

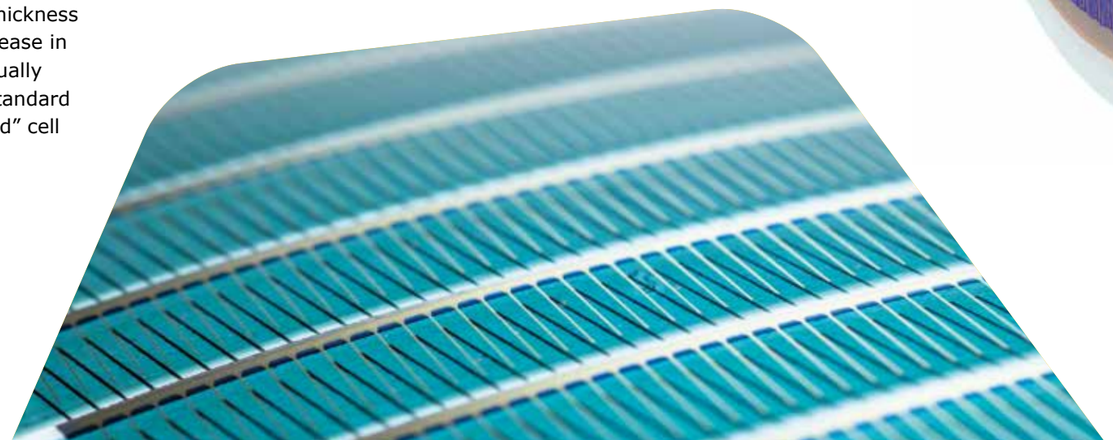
There are many important advantages of OPV technology. Superior performance, compared to inorganic photovoltaics, in low or diffuse lighting conditions is observed. Particularly for indoor light sources or off-angle performance when the sun is low in the sky. In addition, flexibility, semi-transparency and tunable colors are attractive features, and through the use of flexible substrates, it is possible to envisage a vast range of products and applications, which meet future market need.

For example, the combination of the advantages already listed, together with higher performance and improved stability will enable a revolution in the building integrated photovoltaic (BIPV) application market. Other attractive markets include off-grid power applications and consumer electronics. To achieve these aims EMD's R&D team is developing a series of materials targeting these unique benefits. Our lisicon® PV-D and PV-A series can achieve performance in excess of 8 % power conversion efficiency while offering superior processability and solubility. Of critical interest to the OPV field is that EMD materials can be coated from non-halogenated solvents without any detriment to performance. This drastically reduces the environmental impact of processing such materials to a minimum, enabling the concept of a "green" technology.

The lisicon® PV-D and PV-A series delivers very reproducible results. Coating over a range of thickness is possible without a decrease in performance, and it is equally well performing both in standard and the so called "inverted" cell architectures necessary for up-scaled industrial printing processes.

An additional benefit of the material is its attractive color, making it appealing for applications where the visual impression of the finished device is important. lisicon® PV-D is stable during ambient (air) processing and is ideally suited for processing at the typical temperatures required for a production line. Stability of the final device is also improved using lisicon® PV-E materials, an ETL material designed specifically for EMD's PV-A and PV-D materials.

Following the acquisition of AZ Electronic Materials EMD now offers liquid barrier materials, suitable for coating barrier films for a variety of applications – of which one target is OPV.



EMD'S LISICON® PORTFOLIO

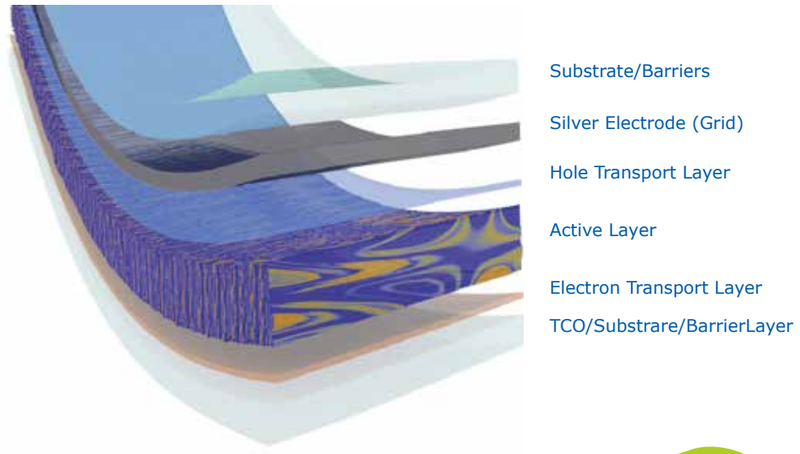
PV-A series	Fullerene derivative materials
PV-D series	Semiconducting polymers
PV-E series	Formulation providing electron transporting and hole blocking layers

EMD'S "WORKING WITH SUNSHINE®" PORTFOLIO INCLUDES OTHER PHOTOVOLTAIC MATERIALS, TOO.

Dye Sensitized Solar Cells (DSSC)
livion®, Solarpur® – non-volatile, low-viscosity electrolyte solutions for DSSCs and highly pure individual components

Perovskite
type solar cells – Solarpur® – Spiro-MeOTAD (named SHT-263)

Crystalline Silicon Solar Cells
isishape® screen printable boron doping pastes



For further information on EMD's photovoltaic product portfolio please contact our key account.