



Merck - Beispiel für Textentwurf als Grundlage für Website

Materials for Photovoltaics

(http://www.merck-chemicals.de/lcd-emerging-technologies/photovoltaic-materials/c_zE2b.s1OloYAAAEhFbAsgkMn)

High-performance PV materials from Merck

Photovoltaics (PV) using solar cells will be one of the dominating energy sources of the future. Solar cells are semiconductor devices which convert the sun's radiant energy into electrical energy. Important PV technologies are crystalline silicon cells, thin-film solar cells, dye-sensitized solar cells, and organic photovoltaic cells. All these cell concepts compete by improving energy efficiency and by the continuous reduction of production costs. Merck contributes to this development by providing innovative, easy-to-use key materials and formulations for next-generation solar cells – products which allow our customers to improve cell performance and to reduce the number of steps in cell manufacturing. In this process, Merck focuses on novel materials, formulations, and process chemicals for both printing and chemical coating technologies of solar cell manufacture.

We offer you:

Structuring solutions

Merck's isishape SolarEtch™ product program offers a broad range of innovative structuring materials that enable simplified and environmentally friendly processes, improved efficiency, and higher production speed for the manufacturing of today's and tomorrow's solar cells. (→Link to isishape page)

Organic electronics for PV

Organic semiconductors are important materials for the development of cost-efficient and flexible thin-film solar cells. Our program of proprietary charge transportation materials is especially designed for improved bulk heterojunction solar cell applications and novel organic photovoltaic cell concepts. (→Link to OPV page)

Research and development

Furthermore, Merck is constantly developing new materials for next-generation solar cells. Our development program focuses mainly on printed formulations for inorganic thin-film cells based on nanoparticles as well as on advanced organic materials for novel cell concepts.



Structuring Solutions

Innovative structuring concepts for solar cell production

For the photovoltaic industry, Merck develops a broad range of tailored structuring materials enabling simplified, environmentally friendly processes, improved efficiency, and higher production speed.

If functional layers on solar cells need to be structured, alternative patterning methods such as photolithography, laser ablation, or plasma etching have certain disadvantages: They are either rather expensive or may cause damages due to particle generation on the surface of the substrates. Our unique isishape™ concept offers screen-printable and dispensable etching materials allowing easy, efficient, and fast patterning.

Your advantages – Fast structuring time and low material consumption

Requiring only a simple 4-step structuring process, Merck's isishape™ structuring materials permit highly economic large-scale production using standard equipment for printing, etching and rinsing. The isishape™ concept enables low material consumption as well as fast structuring time and effectively controls paste spreading behavior. By replacing conventional production technologies, isishape™ enables easier selective emitter design for better electrical parameters of crystalline silicon solar cells. Moreover, the use of environmentally friendly isishape™ products allows easy cleaning without organic detergents, resulting in very low organic concentration in rinse water (Biological/Chemical Oxygen Demand BOD/COD).

Applications – The better alternative

isishape SolarEtch™ products can be used to selectively etch antireflective coatings and passivation layers on solar cells. According to leading R&D institutes, the isishape™ concept is particularly recommended for use in the production of new-generation high-efficiency solar cells.

The technology – How does it work?

isishape™ is able to etch layers of nearly all types of transparent conductive oxides, nitride or oxygen compound materials (e.g. SiO₂, SiN_x), semiconductors (e.g. a-Si, poly-Si) and metals (e.g. aluminum). The innovative isishape™ concept enables a simple structuring process consisting of only four processing steps: printing of etching paste on substrate regions where material needs to be removed, heating up the substrate triggering the etching, rinsing in DI water to clean the substrate from removed layer material, and finally drying the substrate. isishape® materials have already proven their suitability under mass production conditions in various fields of applications targeting different etchable layer systems.



Organic Electronics

High-performance materials for organic electronics

Merck is a leading industrial supplier of OE materials and formulations for the photovoltaics industry. Under the brand names lisicon™ and isitron™, we offer novel printable polymers for cost-efficient organic solar cell production in ready-to-use formulations. Thanks to their solution processability, our materials can be easily processed using a variety of fabrication techniques from spin coating and ink-jet printing to roll-to-roll processes such as gravure and flexographic printing.

Your advantages – Performance, higher mobility and efficiency

Based on more than 10 years of development experience, Merck continuously optimizes its OE formulations for photovoltaics to achieve various performance advantages such as higher mobility and higher efficiency. In addition, their excellent air stability enables processing in ambient conditions, and the final products show exceptional operation lifetime. Merck customers benefit from our state-of-the-art R&D center, large-scale manufacturing facilities, and our global supply chain and support infrastructure.

Applications – For next-generation printed electronic devices

Organic electronics (OE) is an advanced and innovative branch of electronics that has great potential for the photovoltaics industry. A significant benefit of OE technology is the possibility of low-cost, solution-processed fabrication methodologies that offer maximum freedom in terms of size, form factor and application architecture.

Printable OE formulations from Merck can be customized to application-specific requirements and are compatible with mass-production printing techniques.

The technology – What is organic electronics?

OE materials use conjugated aromatic (very stable) carbon-based molecules with delocalized electronic systems tailored to exhibit optimum charge-transport properties. Merck incorporates these materials into ready-to-use ink formulations, enabling direct solution printing of the integrated semiconductor materials onto various surfaces. As demanded by high-performance applications, synthesis of these specialty materials is carried out under high-purity conditions, also considering environmental issues.