

Introduction to the isishape HiperEtch[®] portfolio: Innovative Materials for Touch Screen and Flexible Display Fabrication

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Agenda







Merck is not the same as Merck

- Merck KGaA, Darmstadt, Germany and the U.S. pharmaceutical company Merck & Co., New Jersey, USA, have been two independent companies since 1917.
- Common historical roots:
 - 1891 Merck & Co. founded in New York by Georg Merck, a member of the Merck family
 - As a consequence of World War I, Merck & Co. was expropriated and became an independent company.
- Today, Merck & Co. holds the rights to the name within the US and Canada. Merck KGaA and its affiliated group companies operates here as EMD and holds the rights to the name Merck in the rest of the world.

MERCK

In this presentation "Merck" stands for Merck KGaA, Darmstadt / Germany

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Structuring Solutions Merck



isishape HiperEtch®

Efficient alternative to photo lithography, plasma and/or laser ablation for structuring

- Cut down process steps
- Improve performance
- Environmentally friendly

Easier & faster production, supporting Green Factory approach



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One thing in common.....



- Layer structuring of semiconductors, passivation or ARcoatings, TCOs
- Sometimes selectively (no impact to the layer underneath)

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Possibilities of Structuring



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The isishape[®] process easy, fast & environmentally friendly



- Less process steps
- High material utilisation
- Minimal investments

- Lowest waste water impact
- Safe working environment
- Green Factory" concept



isishape[®] portfolio PRINTABLE STRUCTURING SOLUTIONS **Functional and Semiconductors TCO Layers Metal Layers Antireflective Layers** (wafers and layers) ITO SiO₂ c-Si ΑΙ SiN_x a-Si IZO Ag AZO Cu AI_2O_3 ZnO The chemical concept enables selective etching of layer

systems. Other structuring solutions upon request.



Selective etching is possible ⊘ isishape® SiO_2 METAL PRINTING ITO SUBSTRATE SiO_2 METAL **ETCHING** ITO **SUBSTRATE** SiO_2 METAL **CLEANING** ITO **SUBSTRATE**

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isishape HiperEtch® 11S



Key features

- Screen-printable paste
- 100 nm SiO₂ etching on ITO (without ITO damage) !
- Etching process for SiO₂ without oven
- Smallest line width 100 µm
- Excellent cleaning for substrates and screens with water
- Very low concentrations of organic compounds and etchant in rinse water



isishape HiperEtch® 18S



Key features

- Screen-printable paste
- Qualified for fine line printing and structuring (<50 µm)
- ITO etching at 100-150°C (surface temperature)
- Excellent wetting behaviour for large area printing.
- Good cleaning of Si-Wafers and screens with water-jet only !
- Environmentally friendly process (no HF, no Cl2)



isishape[®] R&D sample 11-S-02



Key features

- Screen-printable paste
- Structuring of silver nano wires or CNT on PET film at 70-100°C
- Smallest line width 150µm on PET film
- Excellent cleaning of substrates
- Very low concentrations of organic compounds and etchant in water after rinsing
- Environmentally friendly process (no HF, no Cl2)



Service

Material system (layer thickness) and typically pattern dimension



- ITO (130 nm) on glass
 40 μm
- ITO (50 nm) on plastic film 50 μm
- SiO₂ (100 nm) on ITO
- Al (200 nm)

50 µm

100 µm

We provide:

- Application support on inline equipment,
- Tailored formulations with customer specific properties including non-contact methods.



Summary

isishape HiperEtch[®] concept shows many advantages in display applications:

Excellent processing

- Very good line resolution (down to 50 µm)
- Standard equipment for printing, etching and rinsing
- Low material consumption
- Fast structuring time (100 nm / minute)

Environmentally friendly

- Very low organic concentration in rinse water
- Easy cleaning without organic detergent
- isishape HiperEtch[®] products contain no chlorides



Do you want to structure smart & simple?



Advanced Materials for New Production & Application Concepts

Easy, Fast & Environmentally-Friendly

WE WILL SUPPORT YOUR SUCCESS

