



Flexible touchscreen – by inkjet printing of new TCO inks on PET foil



## ▶ PILOT TECHNOLOGY

### PRINTED TRANSPARENT CONDUCTIVE OXIDE COATINGS AND PATTERNS

#### OBJECTIVE

- ▶ Deposition of **flexible**, transparent conductive oxide (TCO) coatings and patterns by wet chemical methods, as e.g. dip-coating and printing, on glass and on plastic substrates.

#### METHOD

- ▶ Development of new **TCO inks** using functionalized **TCO nanoparticles** (ITO, AZO) and a binder in a suitable solvent
- ▶ Deposition of the TCO ink on glass or on plastic substrates (e.g. PET foil) or direct printing (e.g. gravure or inkjet printing) of transparent conductive lines and patterns
- ▶ UV treatment or thermal treatment at low temperatures (< 130°C)
- ▶ If necessary thermal post-treatment

#### RESULTS

- ▶ Flexible TCO coatings and patterns on glass and foil substrates (e.g. PET)

	ITO coatings	
Sheet resistance [kΩ/sq]	1...10	(UV treatment)
	< 1	(post treatment, foil)
	< 0.1	(post treatment, glass)
Transmission (visible range) [%]	≥ 95	(coating)
Thickness [nm]	200...> 1000	
Curing / Sintering	< 130°C, UV curing (foil) up to 550°C (glass)	

#### APPLICATIONS

- ▶ Transparent electrodes (e.g. for displays, touchscreens)
- ▶ IR reflecting materials (e.g. for solar control glazing)
- ▶ Antistatic coatings
- ▶ Sensors
- ▶ Printed electronics

Examples of TCO materials investigated at the INM:

- ▶ **ITO** – In<sub>2</sub>O<sub>3</sub>:Sn
- ▶ **AZO** – ZnO:Al

Thin TCO films and patterns prepared by:

- ▶ Spin coating
- ▶ Dip coating
- ▶ Spray coating
- ▶ Roll-to-roll process
- ▶ Gravure printing
- ▶ Inkjet printing
- ▶ etc.

#### CONTACT

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