

Mike Wobser

New Business Development Manager

Fall AIMCAL Technical Conference

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New PEDOT Formulations Enable Highly-Conductive PET

Kodak

Kodak's Polyester Manufacturing

- Internal consumption since 1960
- Clean Manufacturing
- Optical Grade Products
- In-line coating of functional layers
 - adhesion promoters
 - anti stats
 - protective layers
 - conducting layers



Kodak's Experience in Coating PEDOT



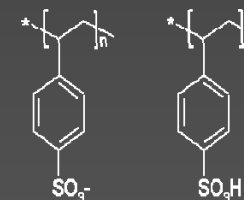
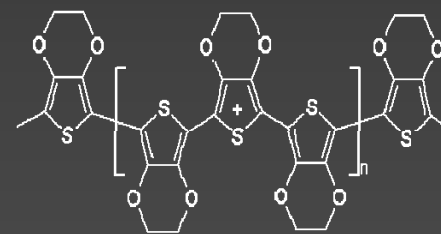
Anti-static Coating

- 2002 – PEDOT introduced as an anti-static layer on Kodak Motion Picture film

Transparent Electrode

- 2003 – initial studies to coat PEDOT as Transparent Conducting Organic Electrode

- Goal :
 - develop film as low cost ITO alternative
 - surface resistivity 100-300 ohms/sq
 - optical transmission > 85%



KODAK HCF 350 Film ESTAR BASE

PEDOT

Primer

4 to 7 Mil Clear PET

Optional Hard Coat



Kodak

The Challenge

PEDOT \neq ITO

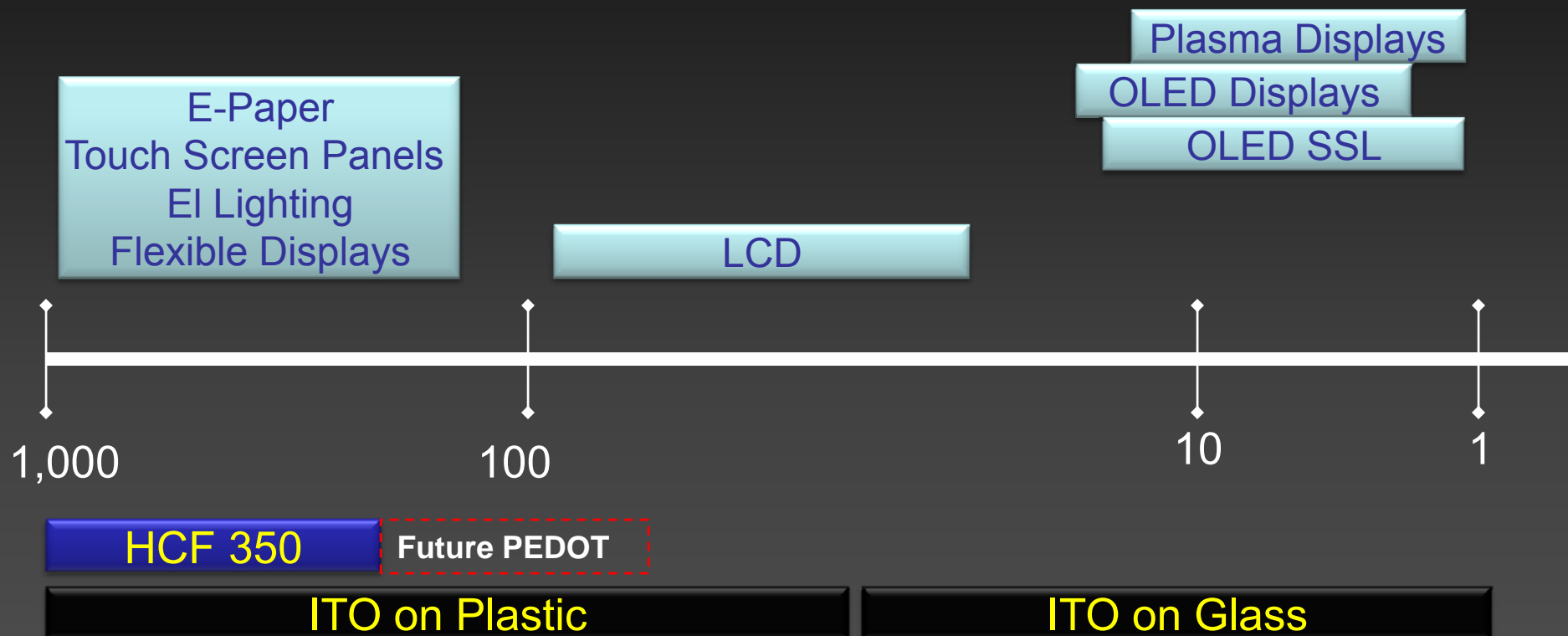
How to achieve film that is:

- conductive,
- transparent,
- flexible,
- durable,
- patternable



Kodak

SER Ranges for Electronic Displays



Optical Properties vs. PEDOT Thickness

Haze

Less Than 1%

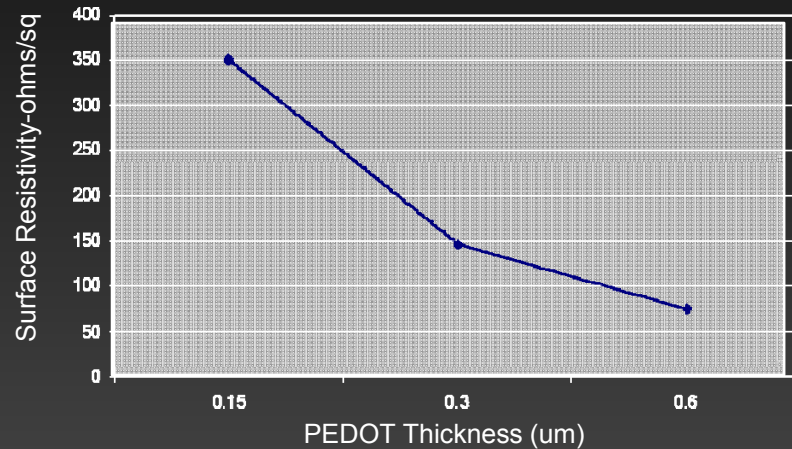
Color

L^* 94.43

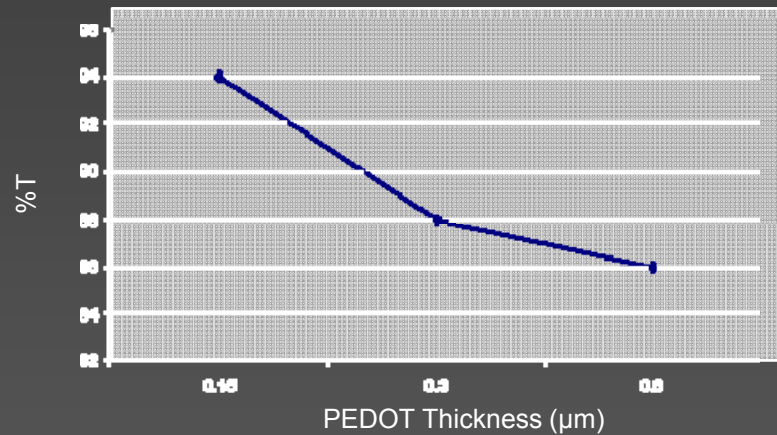
a^* -0.3

b^* -0.6

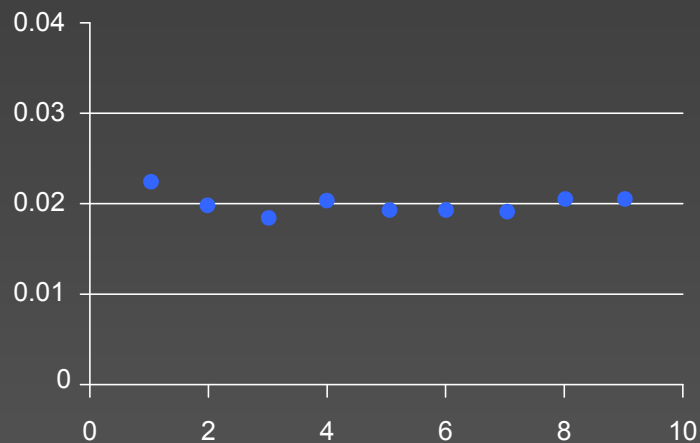
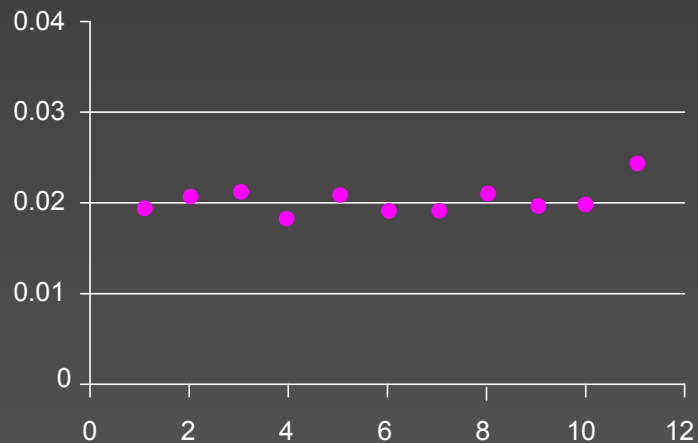
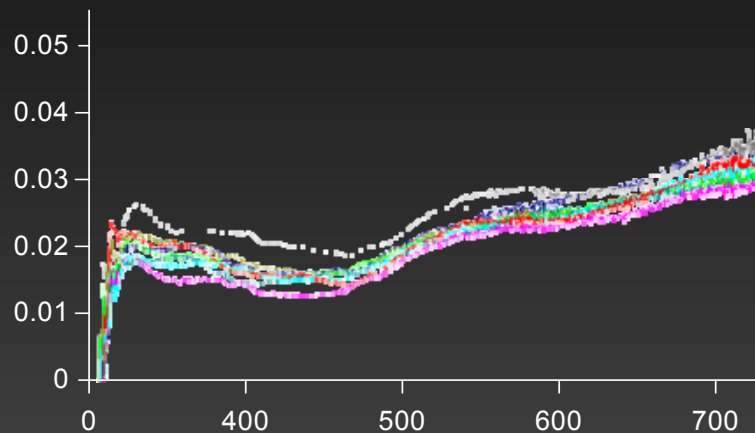
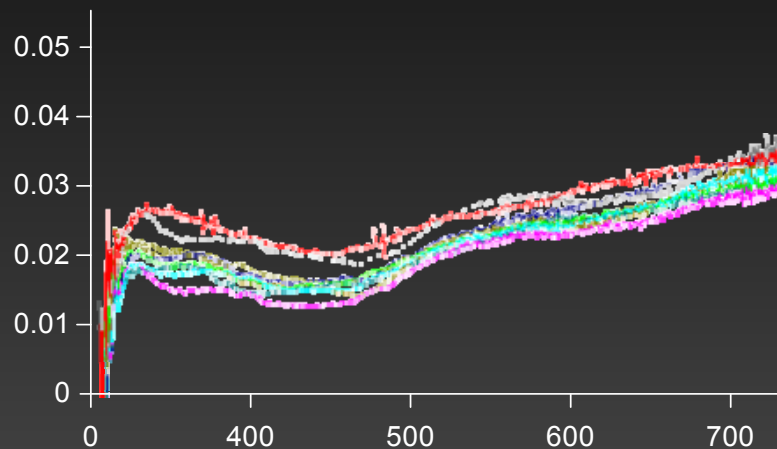
Resistivity vs PEDOT Thickness



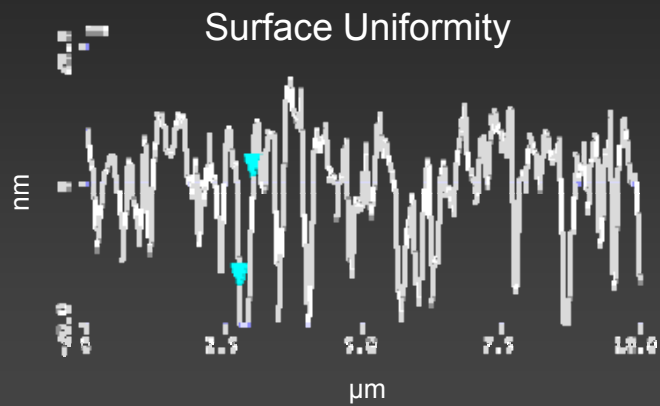
%Transmission vs PEDOT Thickness



PEDOT/PSS Coating Uniformity



PEDOT Smoothness Data



AFM image reveals that the PEDOT-PSS coating is porous with pore size less than $1\ \mu\text{m}$ and Root Mean Square (RMS) roughness is $9.9\ \text{nm}$.

Panel Applications

ASTM F-1842: Tape Test

Kodak PET PEDOT coating received the highest classification of 5B.

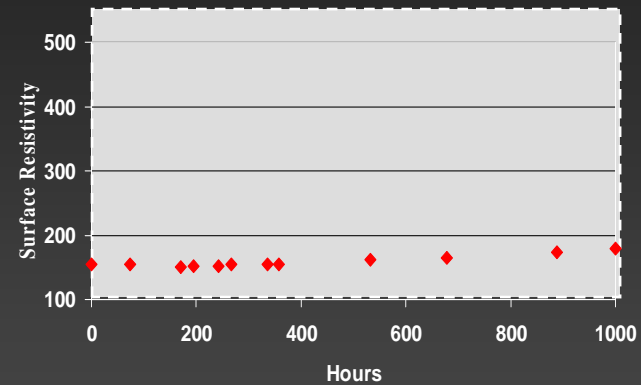
Wet Adhesion

Good performance

Laser Patterning

Film has been successfully laser and chemically patterned.

Temperature/Humidity Effects



Summary

