

Barrier Films for Plastic Optoelectronics

A low cost approach

Location: Workshop Swiss Lasernetwork Basel

Date:25.06.2010

Amcor Flexibles

Value Innovation Center Neuhausen

Amcor Flexibles: part of AMCOR:

- **Biggest company in flexible packaging**
- **Main Markets: Europe, Asia, North America**

Value Innovation Center Neuhausen (CH):

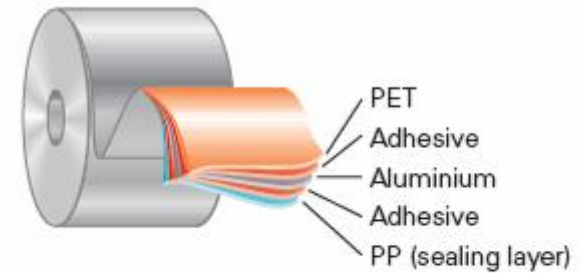
- **R&D center for flexible packaging:**
 - **Printing**
 - **Lamination**
 - **Packaging Analytics**
 - **Forming & Design**
 - **Active Packaging**
 - **Vacuum Thin Film Technology**

Conventional Barrier Laminates: Food product Flexalcon

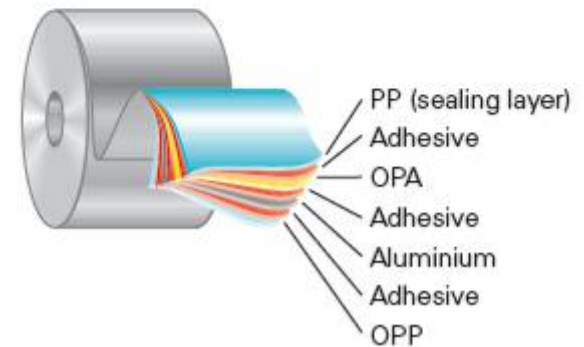


FLEXALCON®
100% Barrier (O₂, water, light)

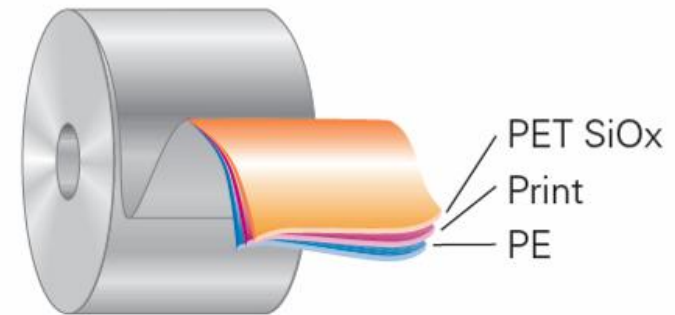
Lid:



Base:



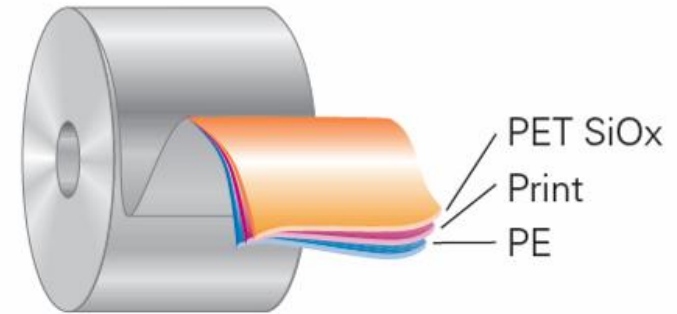
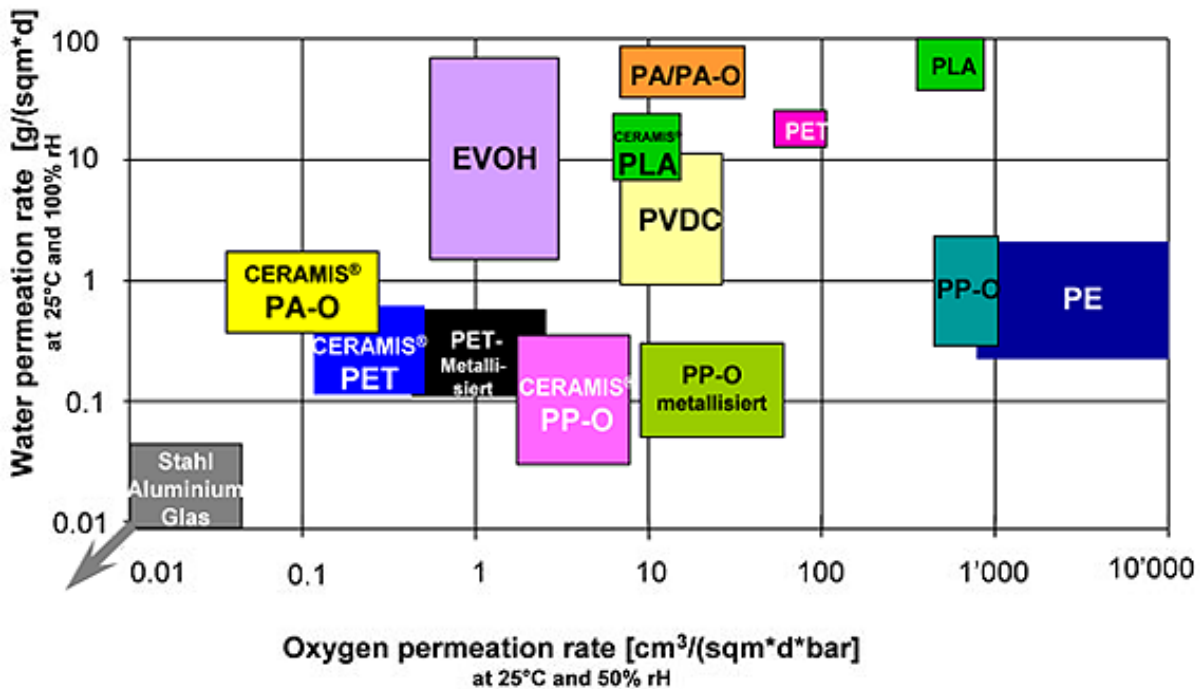
Conventional Barrier Laminates: Light Transparent Barrier



**CERAFRESH
LID**

Deckelmaterial mit
SiOx-Barriere, geeignet
für alle MAP-Anwendungen

Barrier Expertise



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LID**

Deckelmaterial mit
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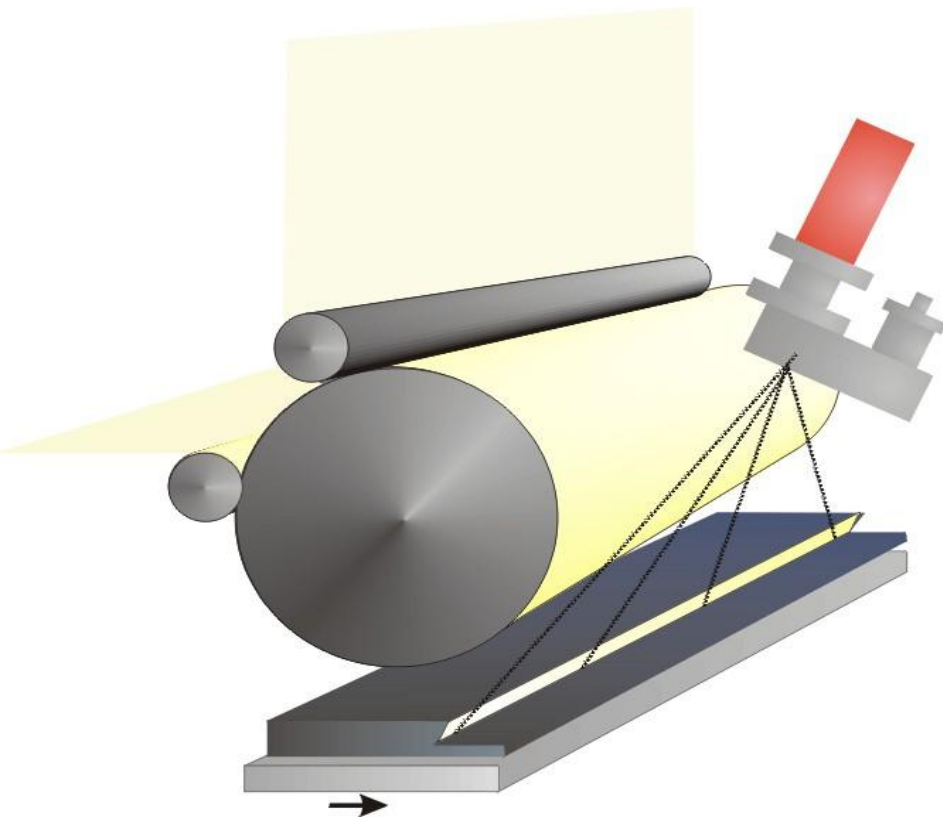
CERAMIS® Production Unit

- **Highlights**
 - **Special inline pre-treatment**
 - **Annual capacity >90 million m²**
 - **Coating width 2m**
 - **Maximum web length: 48000m per roll**
 - **Maximum roll O.D: 1m**
 - **Production web speed:**
 - **840m/min for standard CERAMIS® grade**



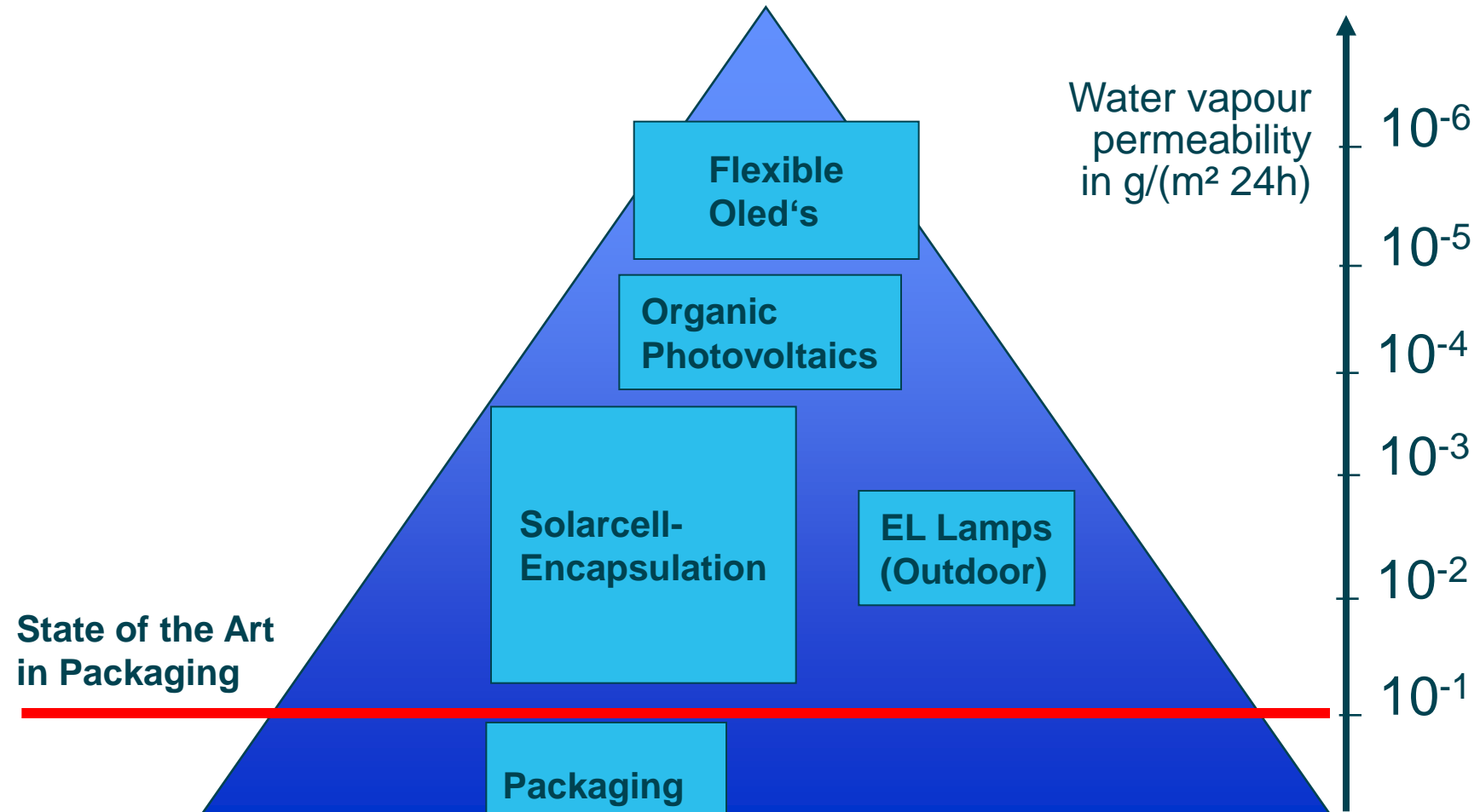
R&D unit in Neuhausen (e-beam, sputtering)

Vacuum Coating



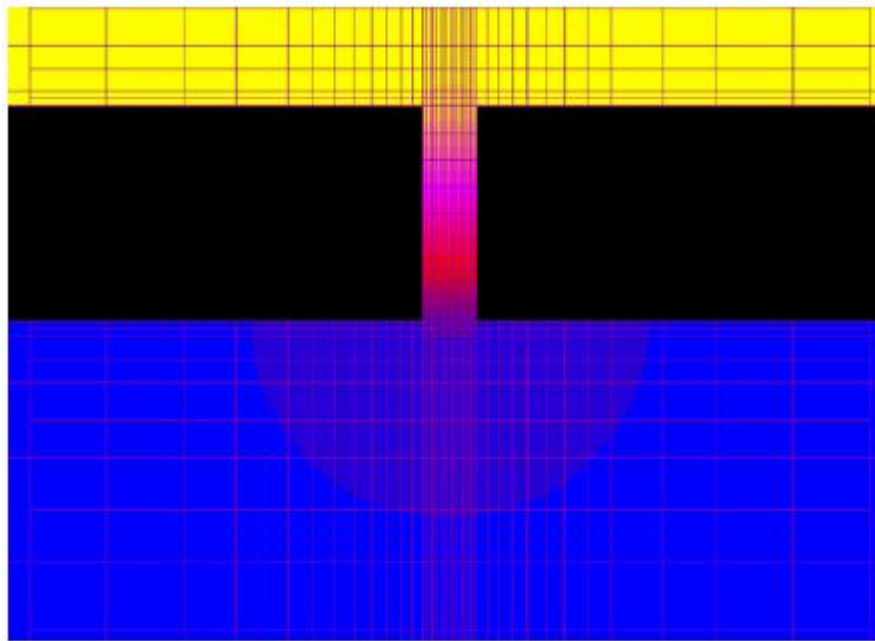
- **Highlights CERAMIS®:**
 - **High speed low cost low cost evaporation process with good barrier properties**

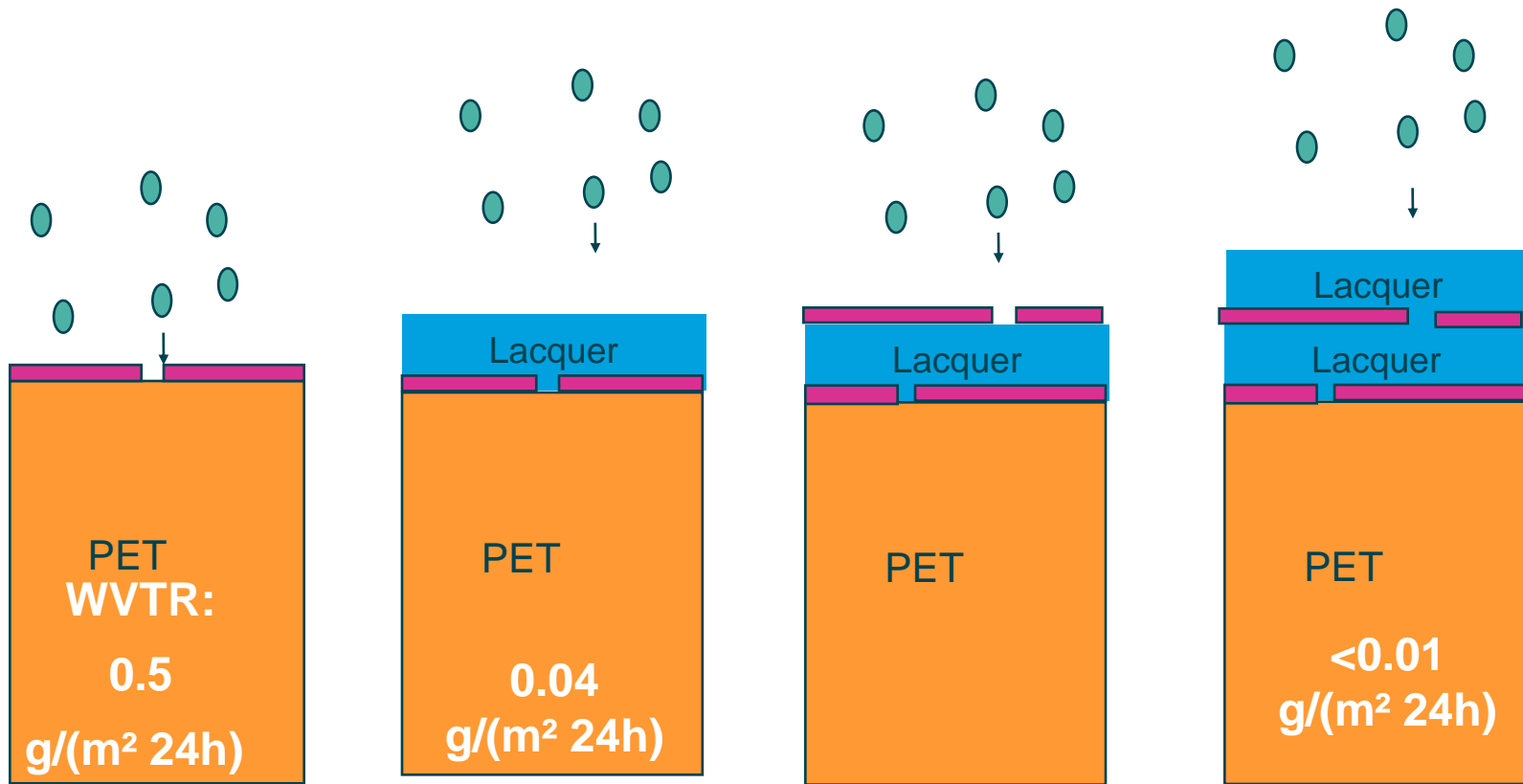
Barrier Coatings For Technical Applications



Barrier Experience: Defect-Model

- organic top layers are reducing the permeation by one order of magnitude





Highest improvement

No improvement



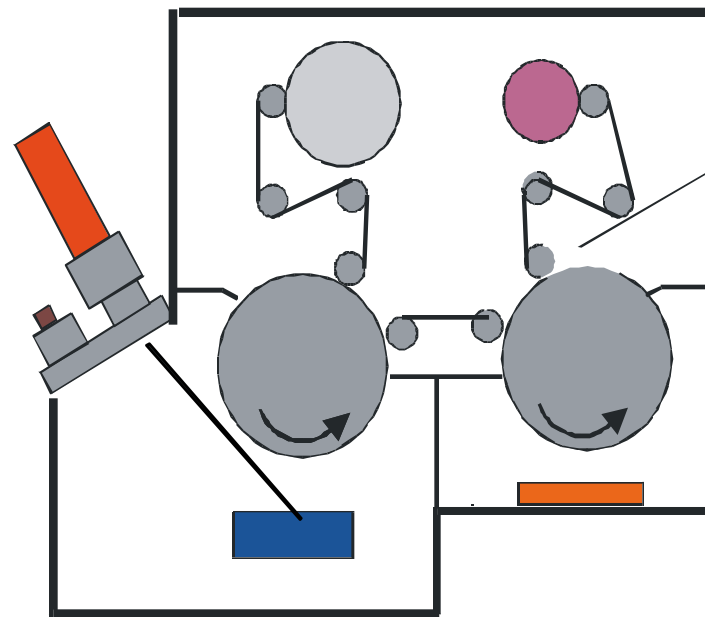
Further improvement

Electron Beam Pilot Line

- **Dedicated development line for CERAMIS**
- **Installed in 1990**
- **Upgraded EB-deflection unit**
- **Optical inline control tool added**
- **2 Upgraded HLK250 sputter cathodes (980mm length)**



Evaporation of
Oxides especially
 SiO_2 (CERAMIS®
process)



EB- Evaporation
Section)

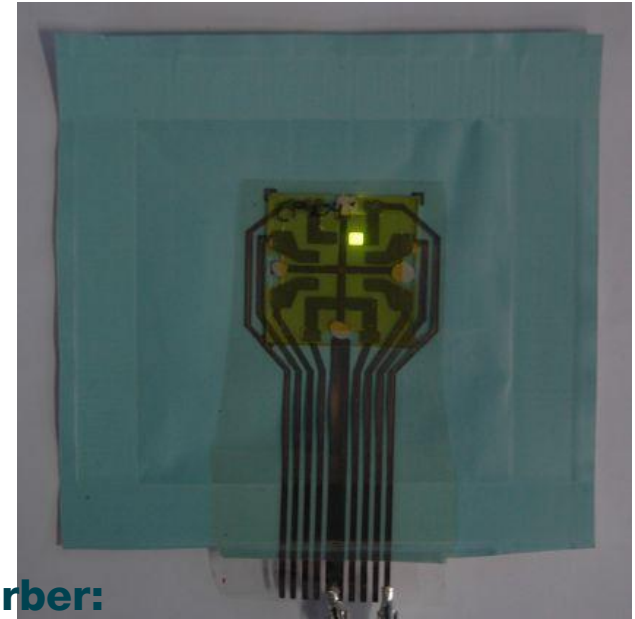
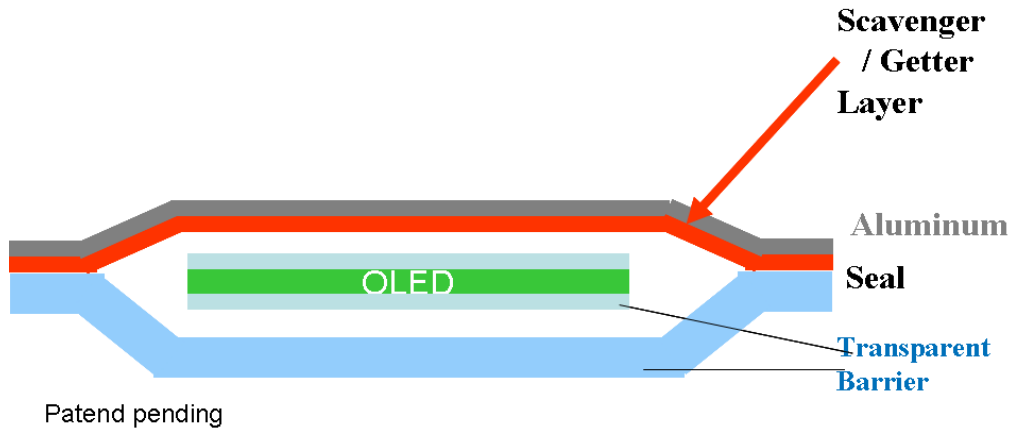
Plasma tools:

2 HLK 250
DC Magnetron or
DC-pulsed
Magnetron
sputtering

or

2 Hollow-Anode rf-
powered plasma
tools (pre-
treatment, polymerisa-
tion)

Barrier Expertise: Super Pouch Concept



**Aluminum Laminate with integrated moisture absorber:
2g/m² moisture absorption capacity**

Transparent barrier film 0.02g/(m² 24h) at 38°C 100%rH

2-fold encapsulation

Theoretical lifetime: 800 days at 23°C,

Demonstrator at CSEM: Capsys Project

Conclusions

- **Packaging Industry has technologies enabling low cost encapsulation for flexible electronics**
- **Low cost encapsulation is needed because:**
 - **1m² of display glas is 11€**
 - **1m² of display glas is 5€**
- **All the cost advantages of roll to roll processing can be easily offset, if the flexible materials are significantly more expensive than glas**