INNOSHADE - Figures for Final Report

Project logo

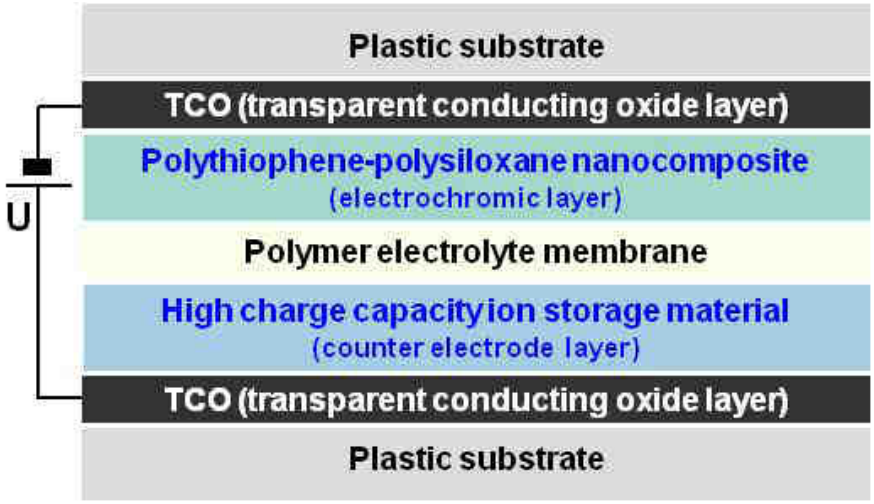
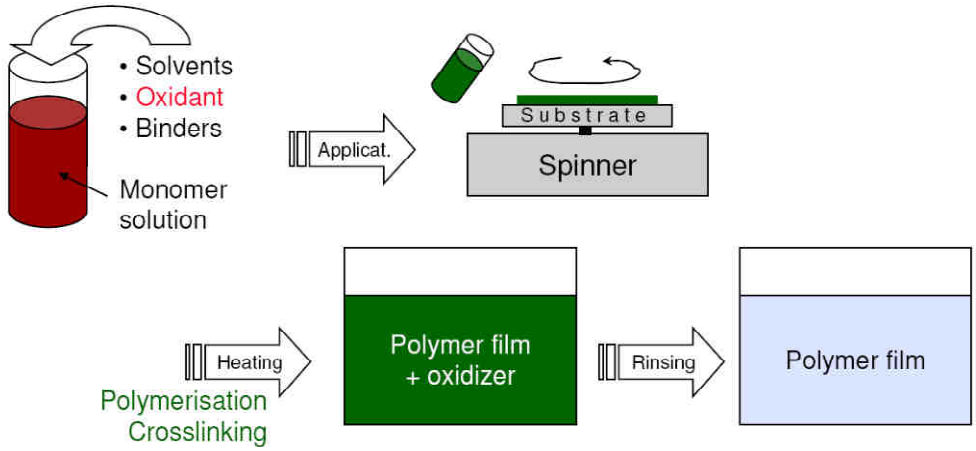


Figure 1. Basic sandwich-type EC device configuration developed in INNOSHADE.



Scheme 1. In-situ chemical oxidative polymerisation of MoC to form polyMoC films.

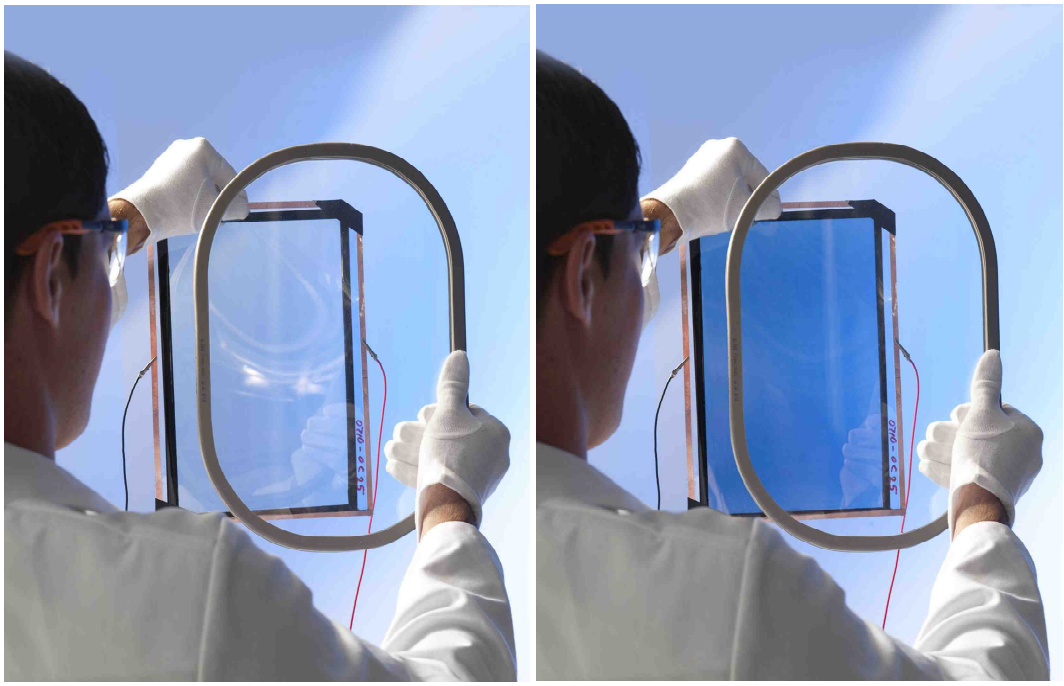


Figure 2. A4 sized EC film positioned behind a standard aircraft cabin window frame. Photos: K. Dobberke for Fraunhofer ISC.

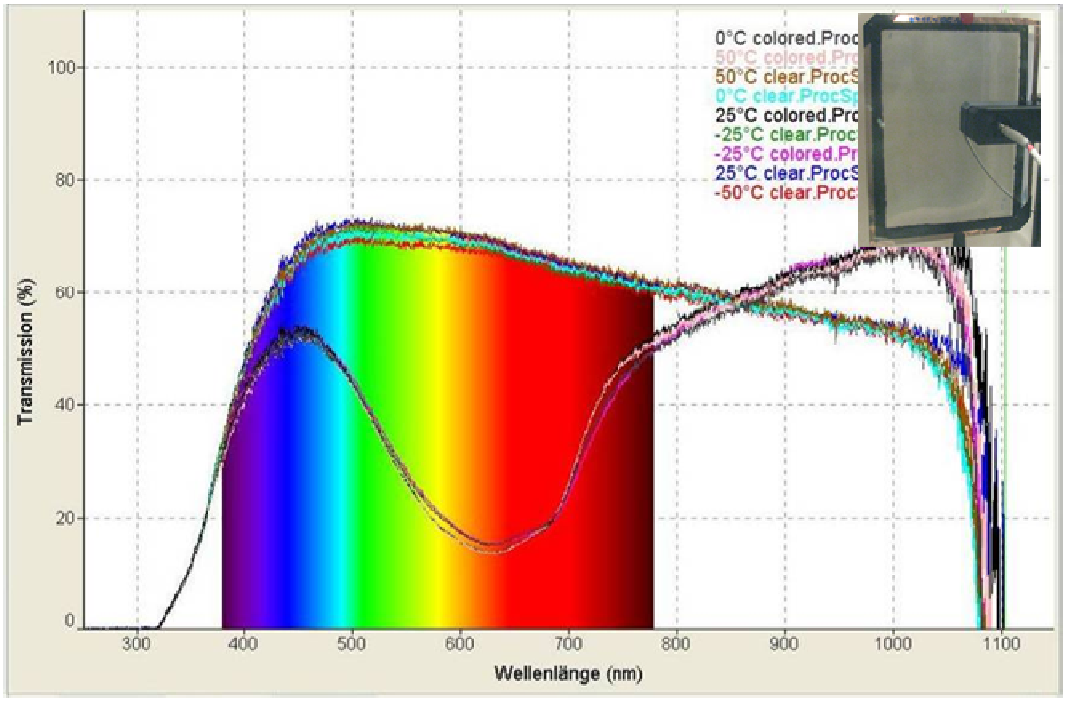


Figure 3. Determination of the optical transmittance in clear and coloured state of an INNOSHADE EC film sample at temperatures from -50 to +50°C.

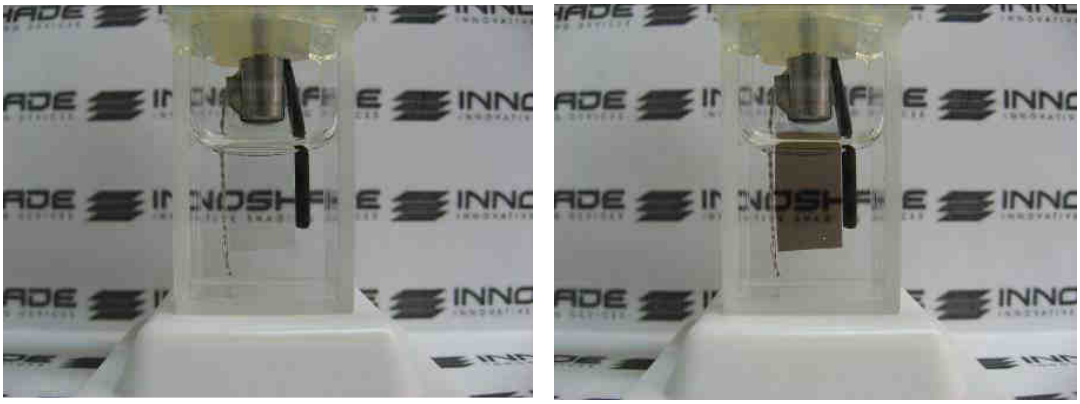


Figure 4. Bleached (left) and coloured (right) states of the polyISO-7 colour modifier layer. Photos: R. Ruffo/Università degli Studi di Milano-Bicocca.

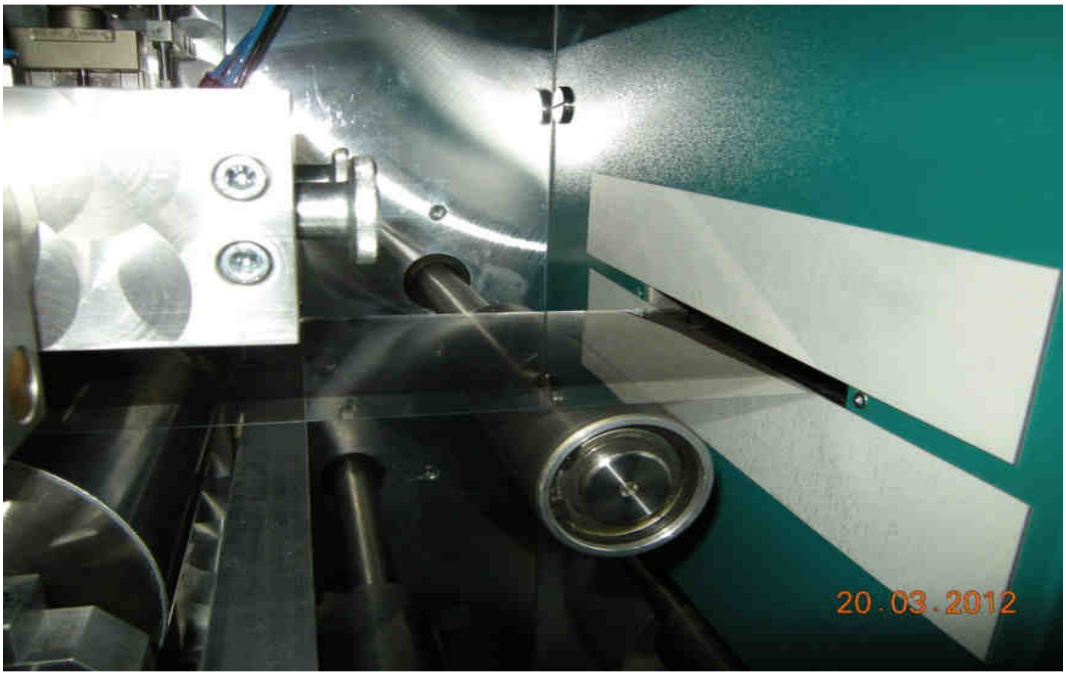


Figure 5. Application of a $Ni_{1-x}O$ pigment suspension on PET-ITO film on a COATEMA Smartcoater. Photo: M. Mohor/National Institute of Chemistry Ljubljana.

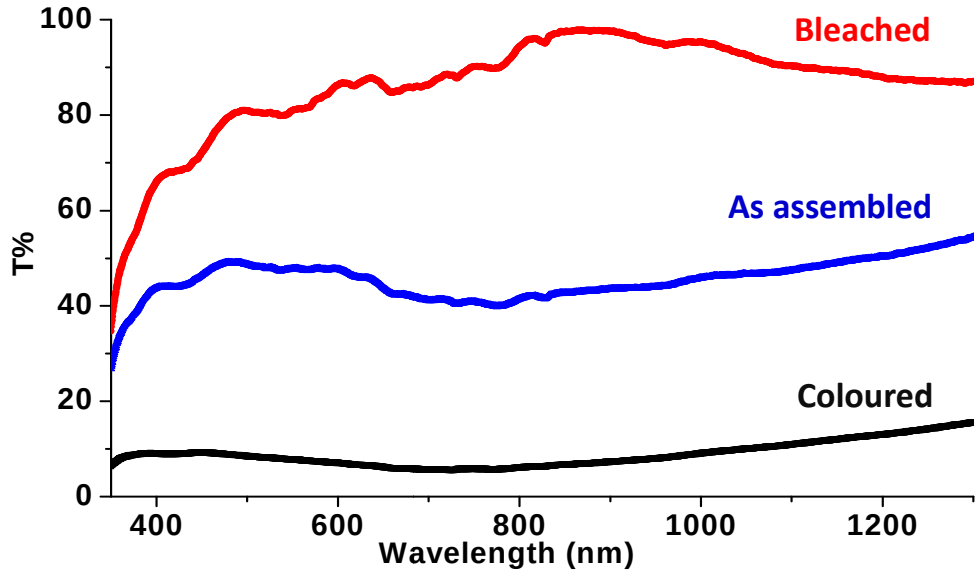


Figure 6. Transmittance spectra of a neutral tint EC device with exceptional optical contrast.

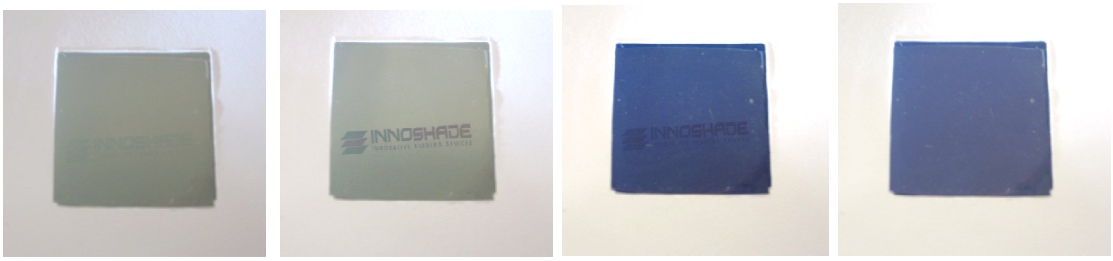


Figure 7. Optical states of a PDLC-EC tandem device: hazy-colourless (PDLC off, EC 2.0 V / blue curve), clear-colourless (PDLC on, EC 2.0 V / green curve), clear-blue (PDLC on, EC -2.0 V / red curve), and hazy blue state (PDLC off, EC -2.0 V / black curve). Photos: J. Palenzuela/CIDETEC.

Figure 8. Flexible plastic-based electrochromic device. Left: Bleached state, +1.5 V; Right: darkened state, −1.5 V. Photos: U. Posset/Fraunhofer ISC.

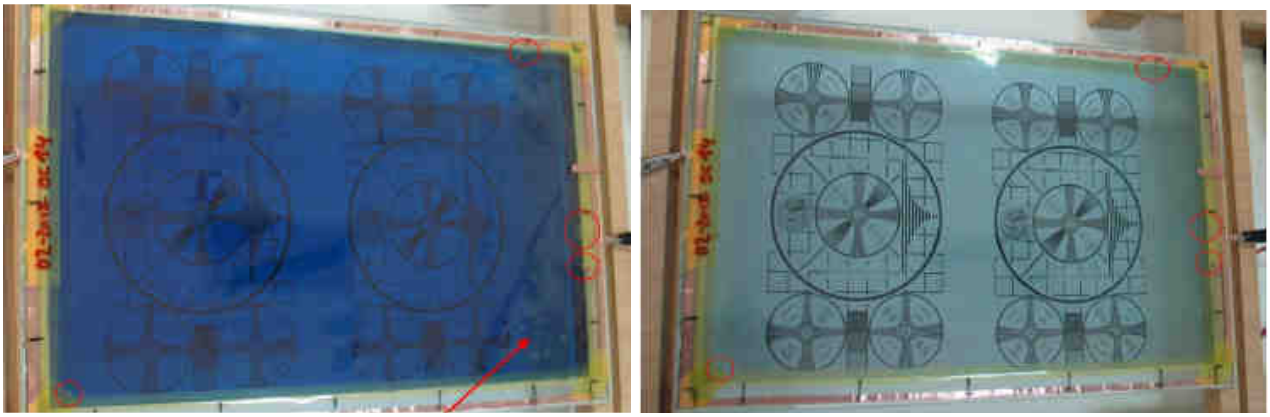


Figure 9. Left: Coloured state, right: bleached state of an INNOSHADE appliance door demonstrator (size A3+). Photos: B. Kralj/ GORENJE.

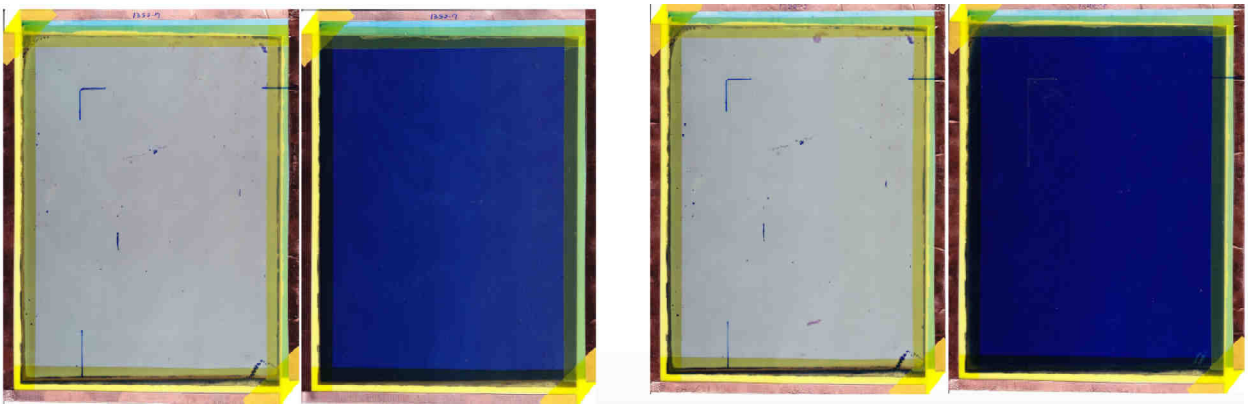


Figure 10. Cycle stability of an A5 sized polyMoC vs nano-PB sample device under laboratory conditions. From left to right: bleached state at cycle 1, coloured state at cycle 1, bleached state at cycle 120.000, and coloured state at cycle 120.000. Photos: M. Salamone/ Università degli Studi di Milano-Bicocca.

Figure 11. CC09 Pilot line after assembly. Photo: N.N. for COATEMA.

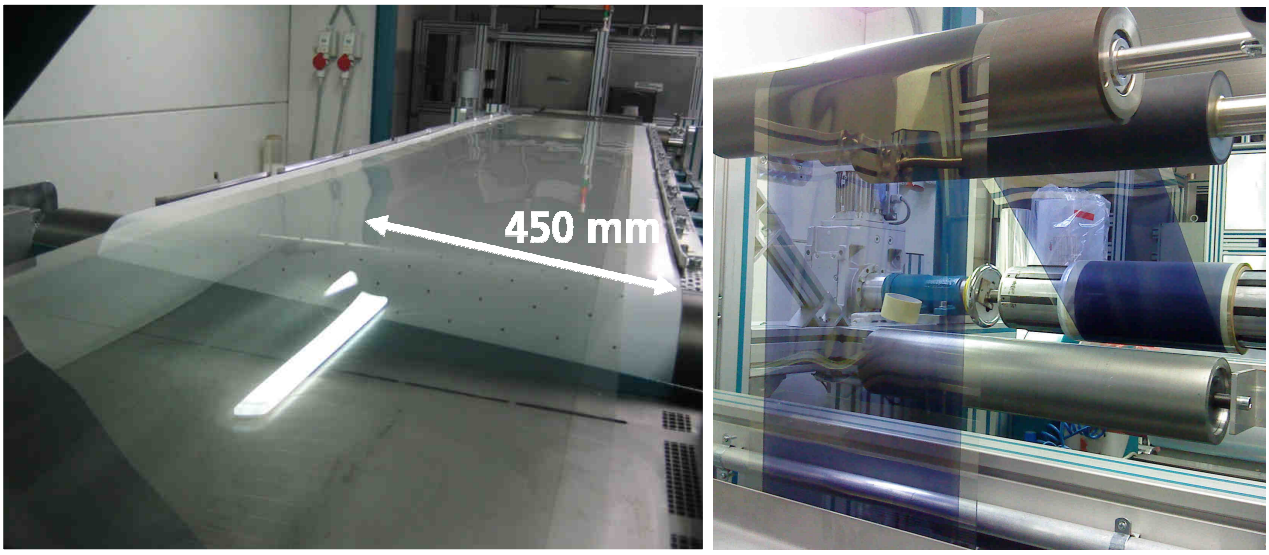


Figure 12. Left: High-throughput in-line processing of PolyMoC on PET-ITO film (application width 450 mm). Right: lamination-ready rinsed PolyMoC film. Photos: U. Posset/Fraunhofer ISC.

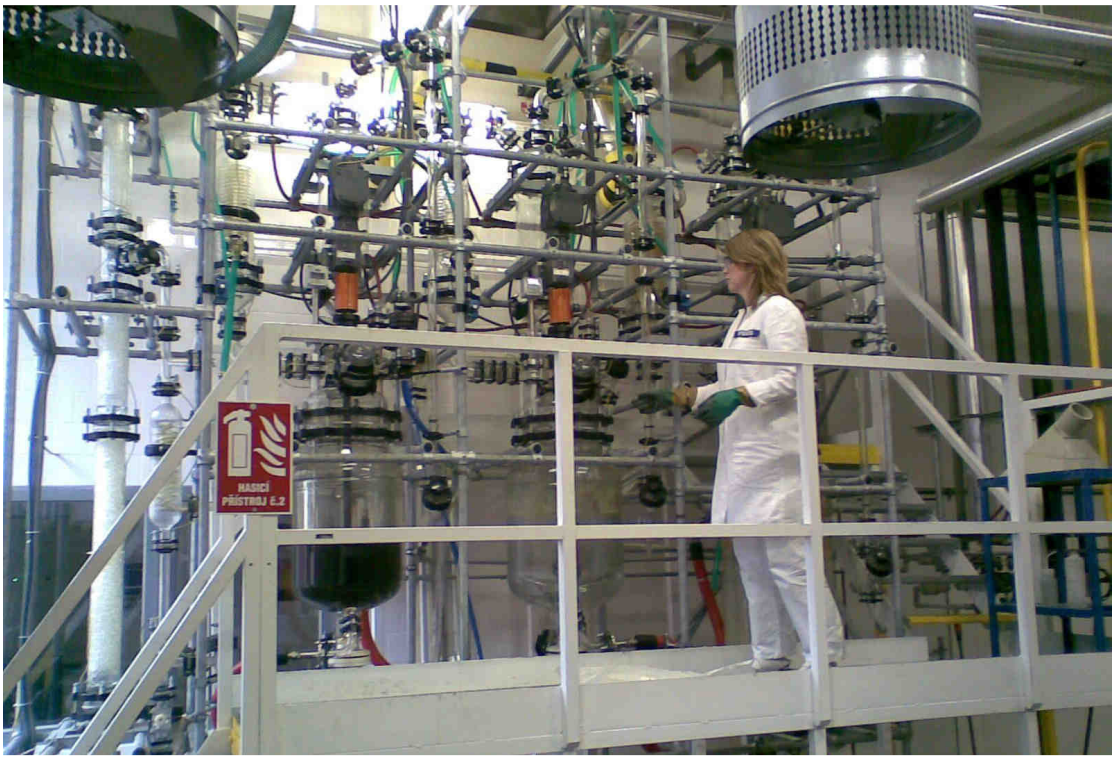


Figure 13. INNOSHADE glass pilot-plant for intermediate and MoC synthesis. Photo: L. Kubac/COC Ltd.

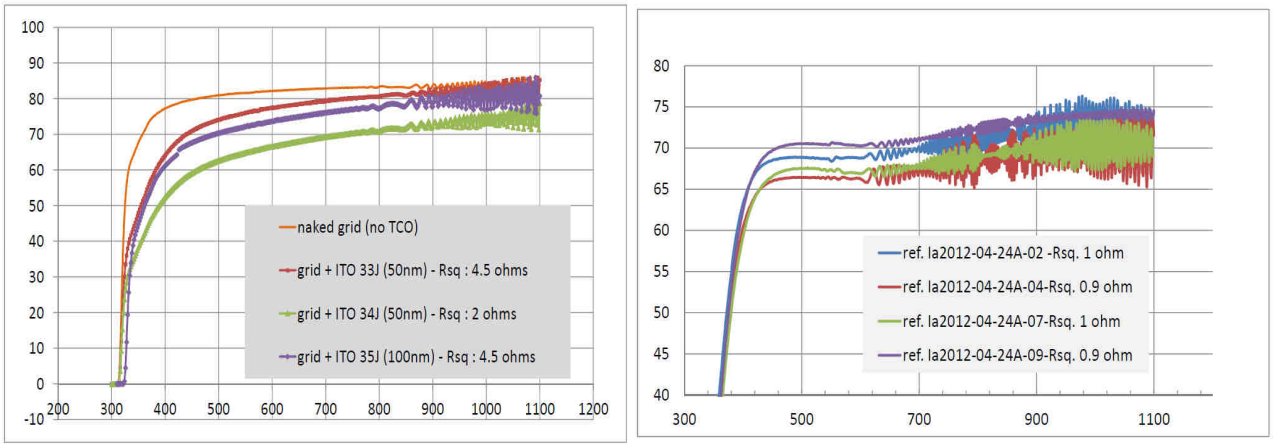


Figure 14. Transmittance spectra of hybrid transparent electrodes: Left: ITO/Cu grids/PET; right: R2R-GZO/Cu grids/PET.

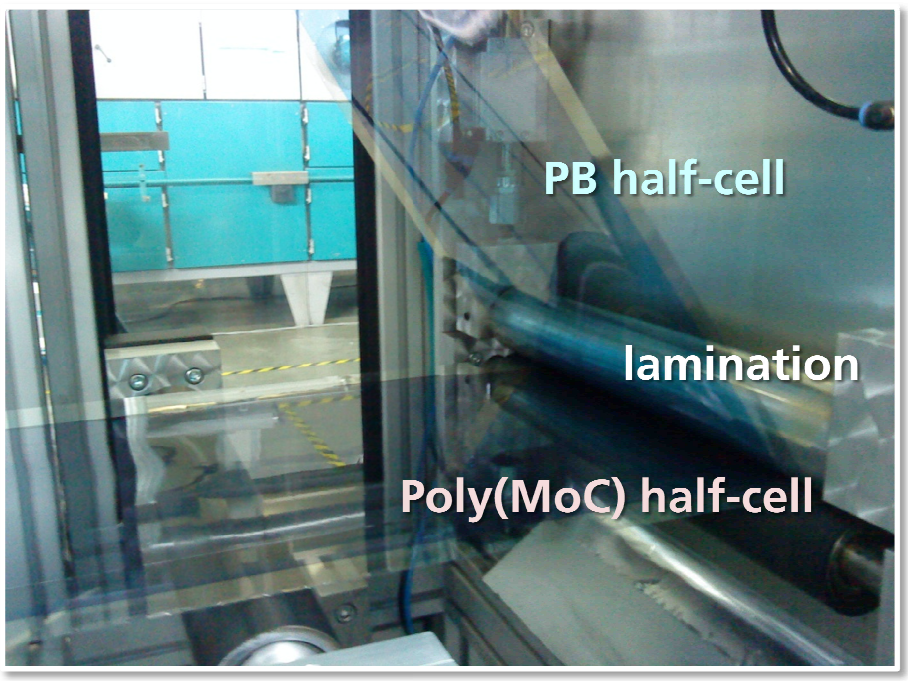


Figure 15. Lamination of working and counter electrode on a BC40 lamination line. The electrolyte resin has been applied on the working electrode by slot die coating beforehand. Photo: U. Posset/Fraunhofer ISC.

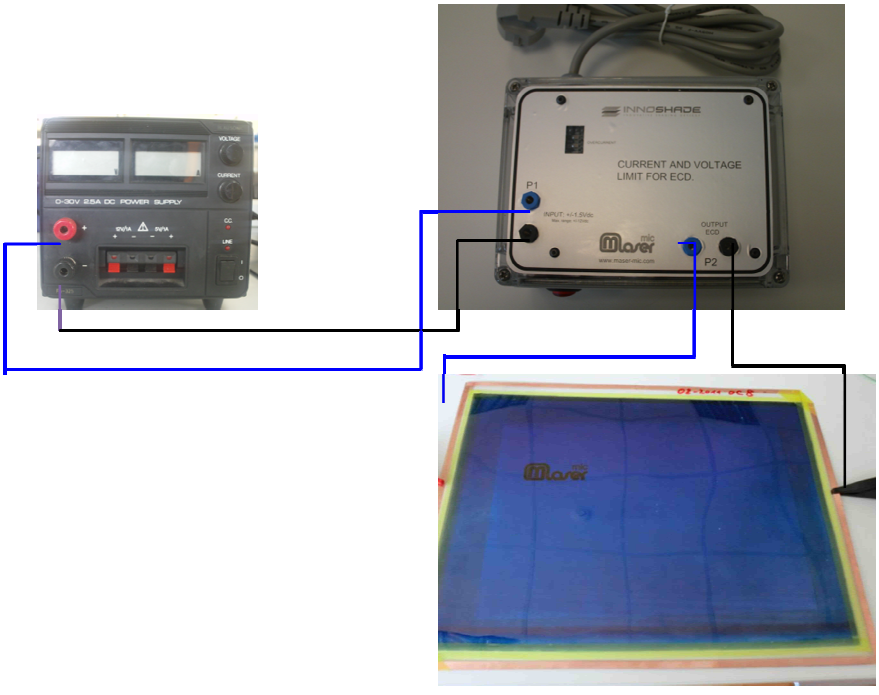


Figure 16. Electronic control unit for EC device testing. Left: Power source, upper right ECU, lower right: EC device. Photos: S. Lopez/MASER Microelectronica.

Figure 17. Demonstrator of an Airbus A320 cabin wall equipped with an INNOSHADE EC device. Photo: H. Fietzek/EADS.

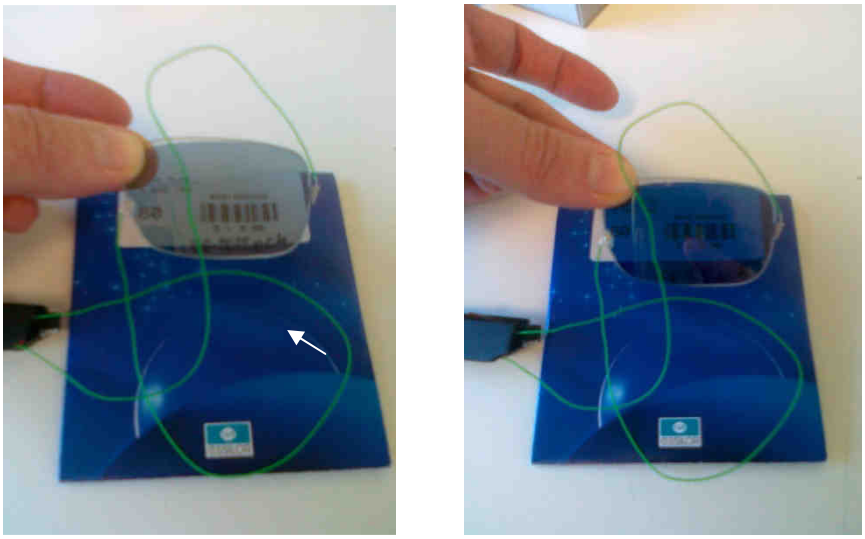


Figure 18. Demonstrator lens in its bleached and darkened states. Photos: C. Biver/ESSILOR.

Figure 19. Household oven prototype with included INNOSHADE EC film for energy consumption modelling. Left: dark state – internal light off, middle: clear state – internal light on, right: dark state – internal light on. Photos: O. Ersoy/ARCELIK.

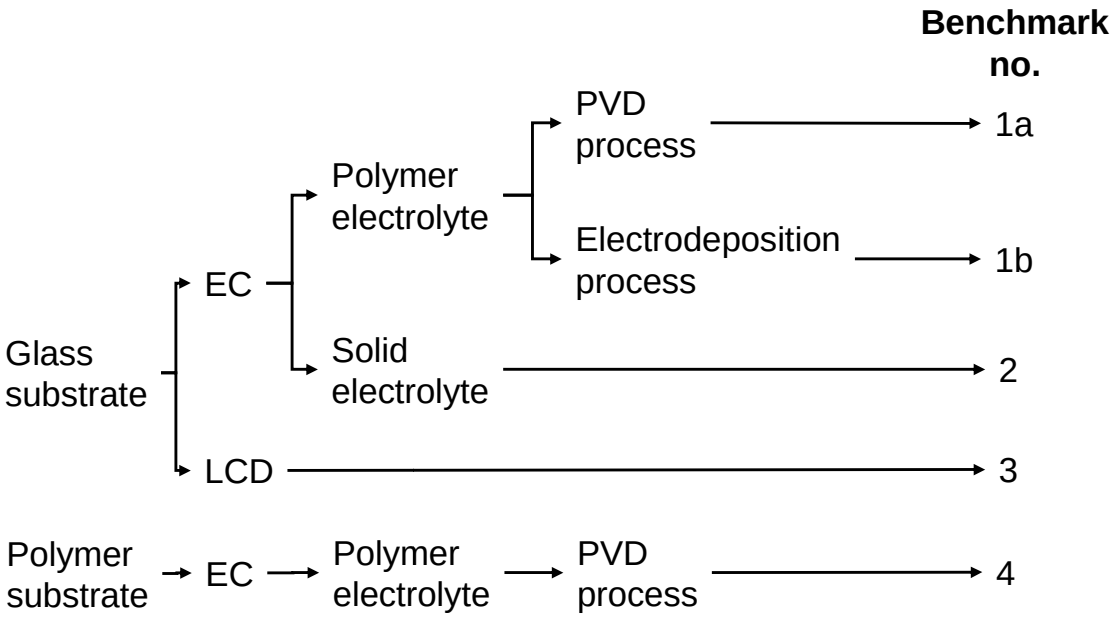


Figure 20. LCA Benchmark Overview.

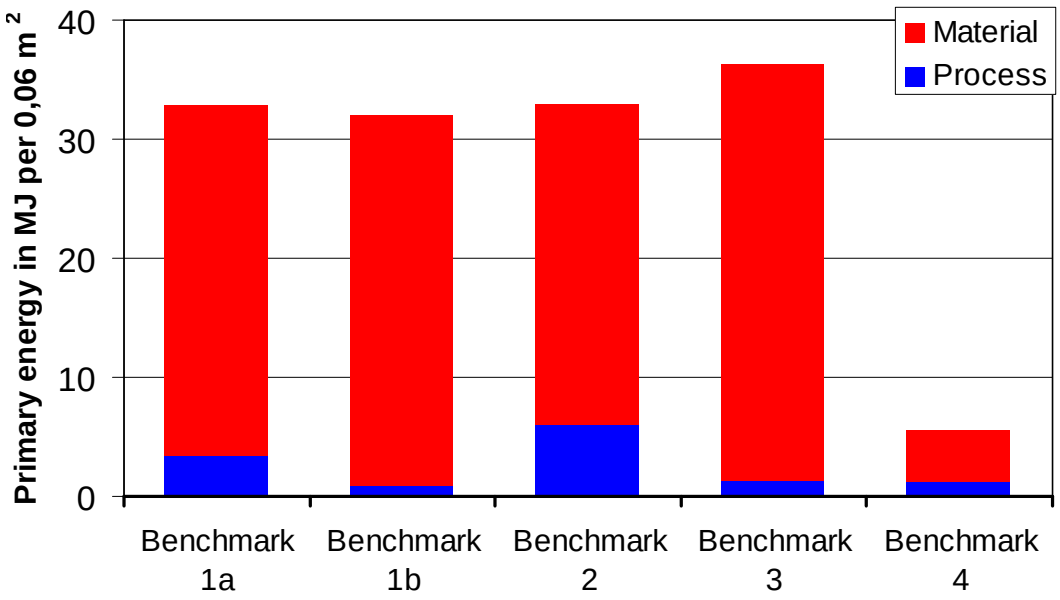


Figure 21. Primary energy demand per functional unit.

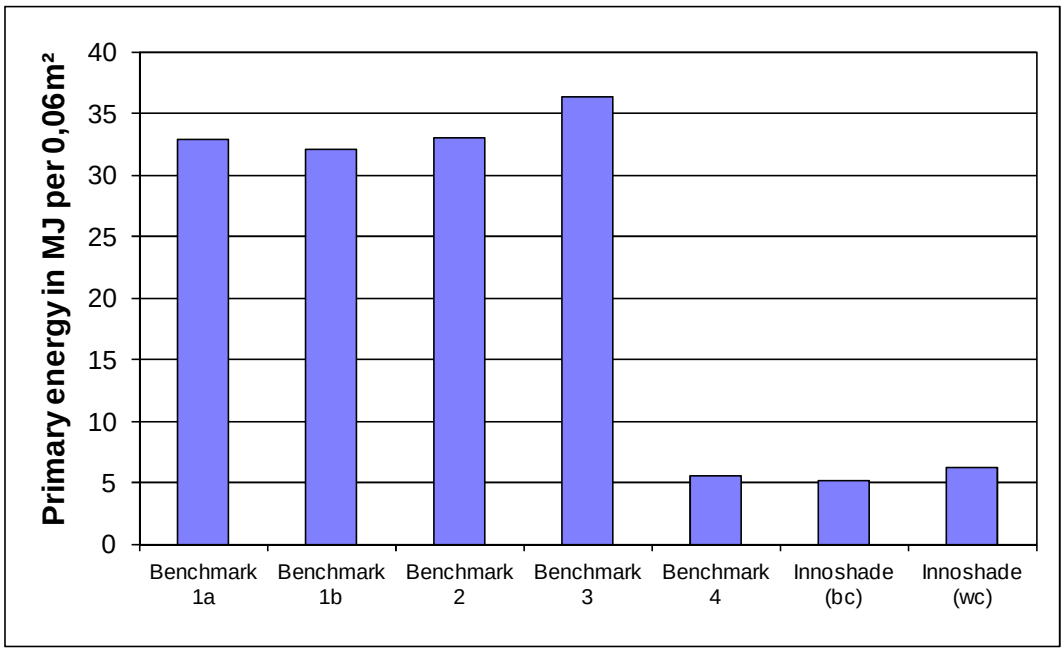


Figure 22. Comparison of devices, system boundaries: cradle to gate; bc: best case, wc: worst case scenario.

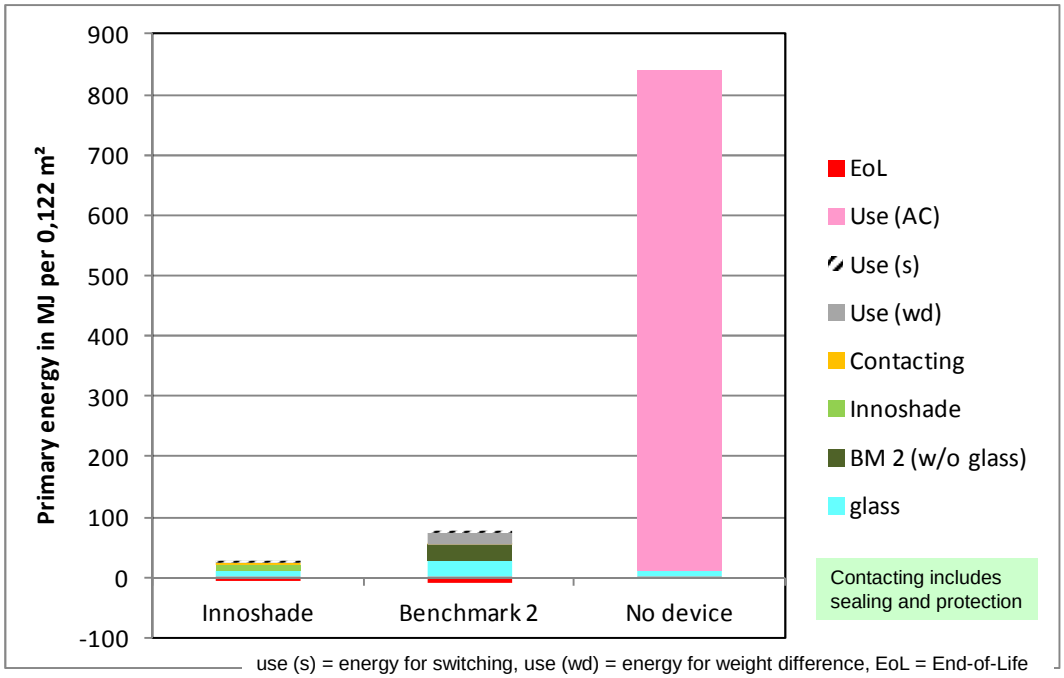


Figure 23. Primary energy demand for the automotive sunroof EC application (cradle-to-grave).