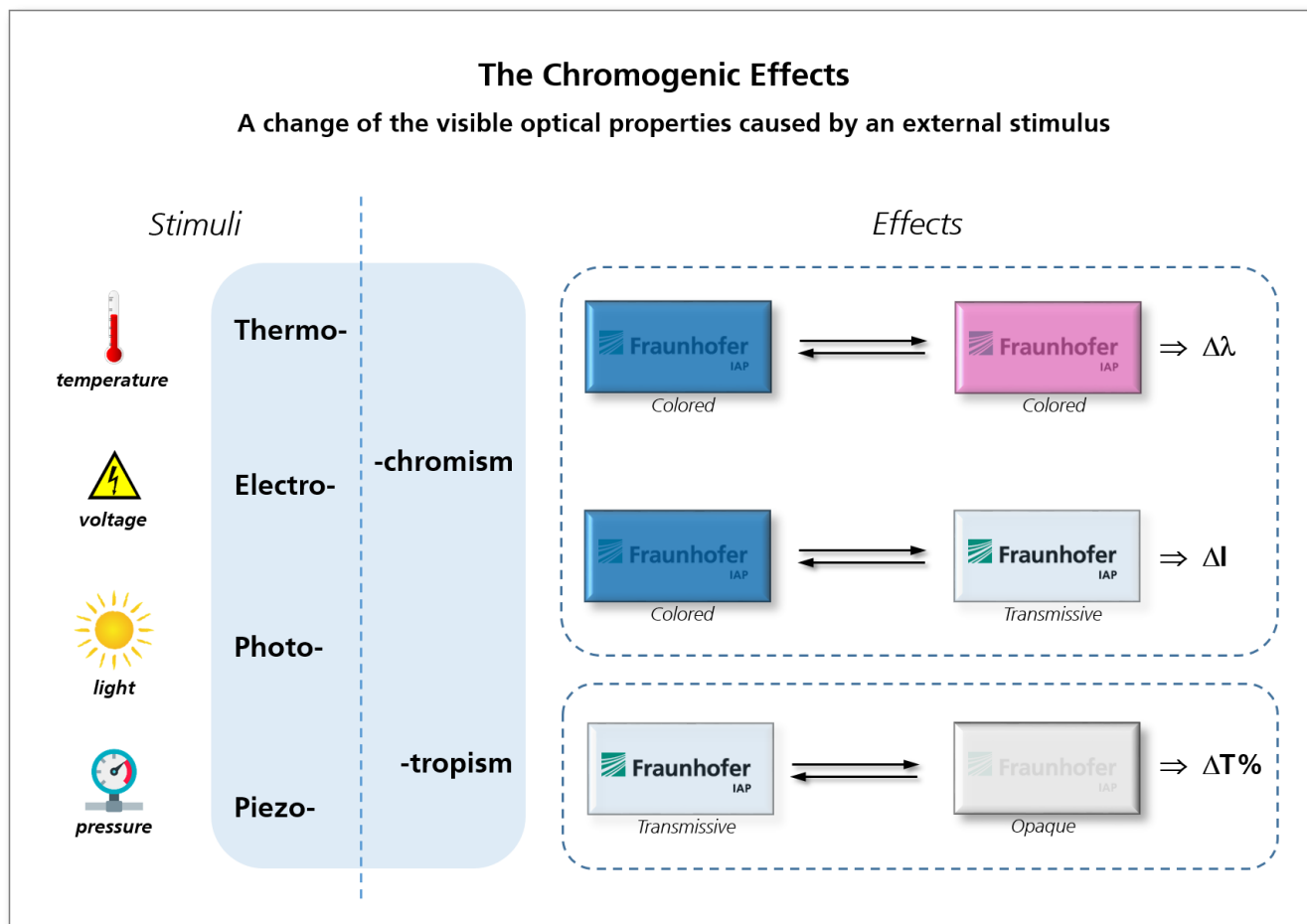


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[1] Seeboth, A.; Loetzsch, D.; Ruhmann, R.; Muehling, O., *Chem. Rev.* **2014**, 114, (5), 3037-68.

[2] Seeboth, A.; Loetzsch, D., *Thermochromic and Thermotropic Materials*. PanStanford Publishing Pte. Ltd.: **2014**.

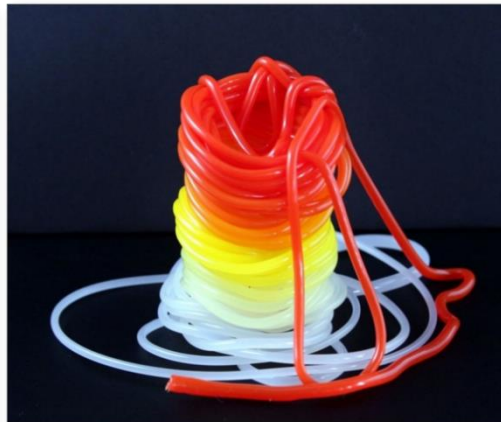
[3] Loetzsch, D.; Eberhardt, V.; Rabe, C., *Chromogenic Materials*. In Ullmann's Encyclopedia of Industrial Chemistry, Wiley-VCH Verlag GmbH & Co. KGaA: **2016**.

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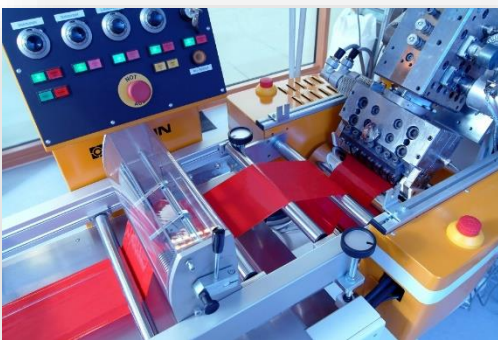
Thermochromic



Thermochromic cast resin



Thermochromic strand

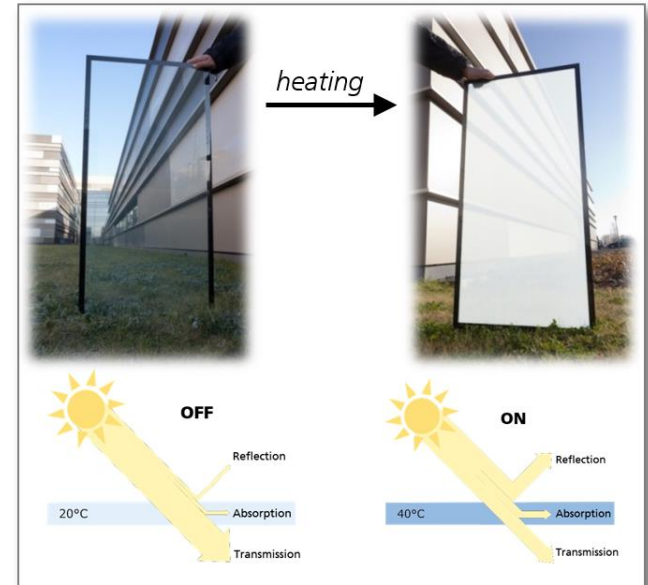


Flat film extrusion of thermochromic polymer

Features:

- Customizable switching temperature
- Reversible or irreversible
- Combination of colors or effects
- Adaptable to different matrices

Thermotropic



Samples of thermotropic windows



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Piezochromic



Hypsochromic color change of piezochromic films under mechanical stimulation

Piezochromic Materials:

- Oriented and stabilized liquid crystalline phase
- High pressure sensitivity
→ $\Delta p < 1$ bar
- Tunable pressure range

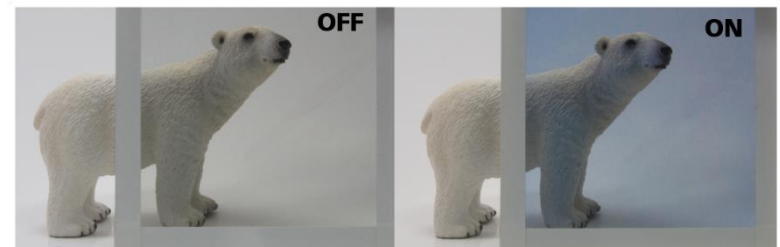
Electrochromic Materials:

- Electrochromic cast resin
- Highly stable glazings
→ Large areas
- Organic materials
→ Low costs
→ Color variation
- Fast switching

Electrochromic



Electrochromic 1.2m²-sized window at the glasstec fair 2016 in Düsseldorf




Fraunhofer IAP



Fraunhofer-Institute for Applied Polymer Research
Department of *Chromogenic Polymers*, Head: Dr. Christian Rabe

 [Geiselbergstr. 69, 14476 Potsdam-Golm](https://www.google.com/maps/place/Geiselbergstr.+69,+14476+Potsdam-Golm)

 +49(0)331 568 2320

 christian.rabe@iap.fraunhofer.de

 www.iap.fraunhofer.de

