

UV-Blocking Smart Windows Based on Polymer Dispersed Liquid Crystal-Filled Modified Woods

Energy-efficient smart windows represent a novel technology for replacing traditional glass windows



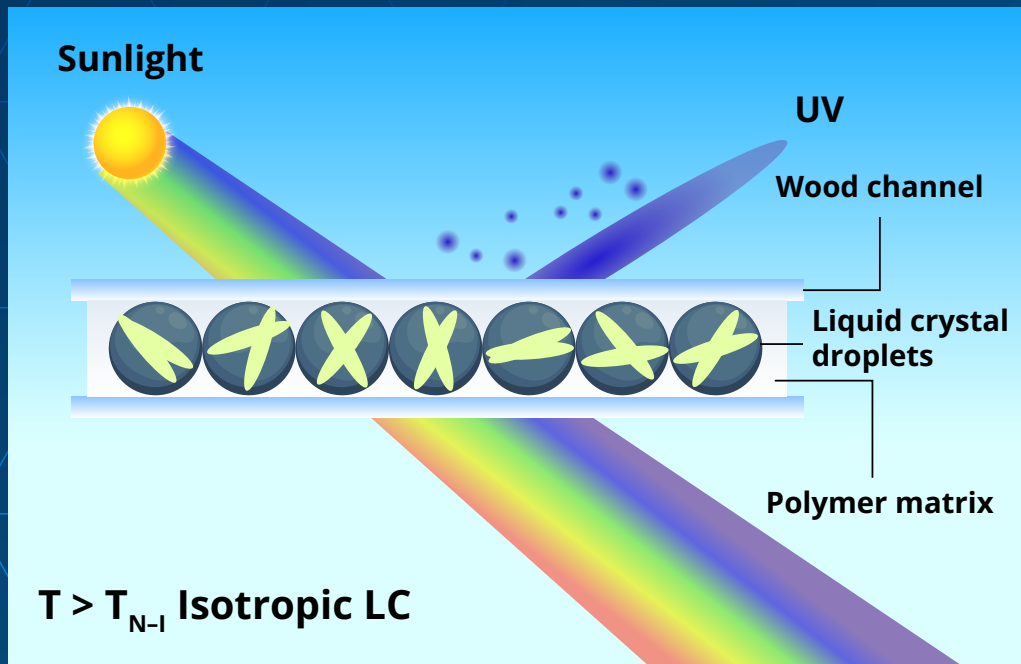
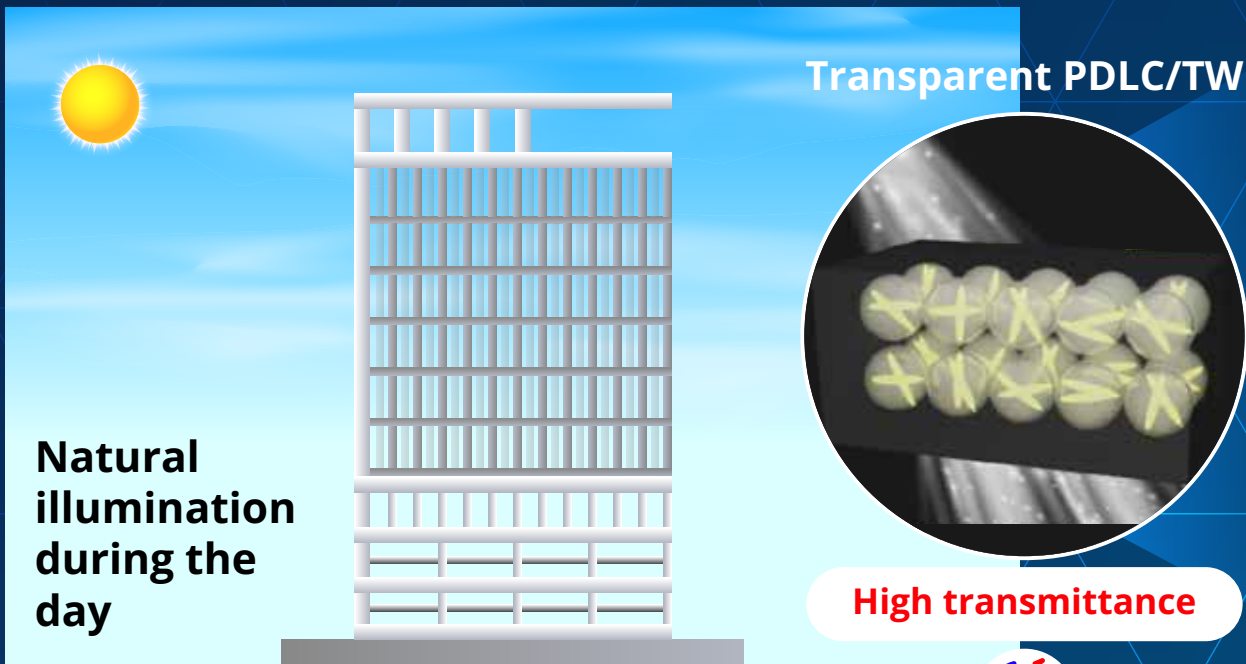
- ✓ Optical modulation
- ✓ High transparency
- ✓ Ultraviolet (UV) blocking
- ✓ Heat shielding



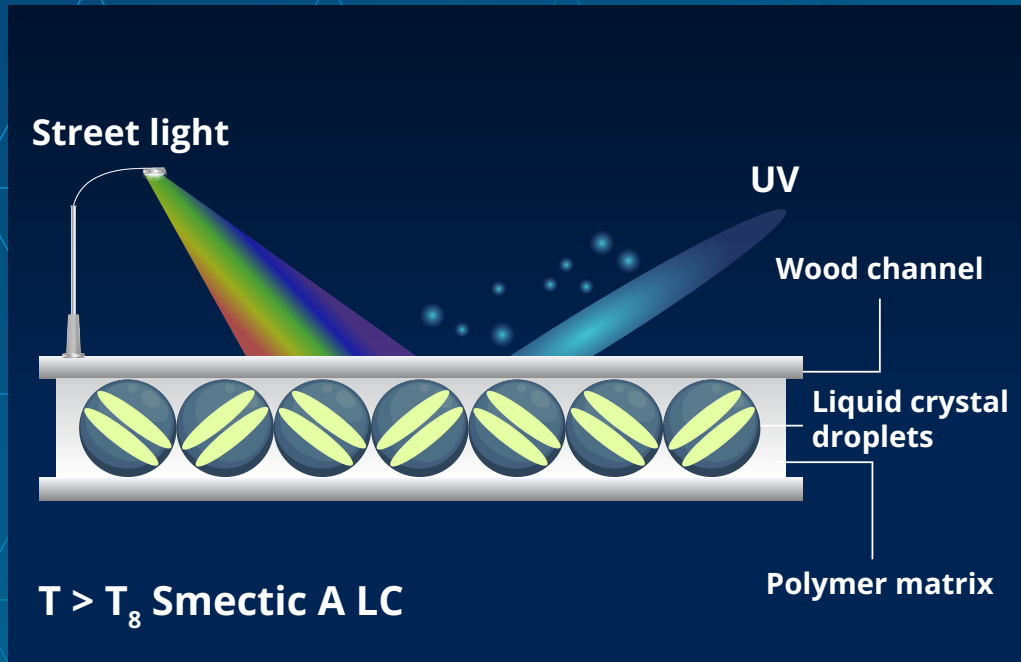
They can protect household items and human health

Polymer dispersed liquid crystal (PDLC)-impregnated switchable thermochromic transparent wood (TW) technology

78% transmittance at 40 °C



28% transmittance at the room temperature



Balsa PDLC/TW: Best performance

- ~100% UVA radiation blocking via "j-aggregation" effect
- 5x lower thermal conductivity than glass

Applications

- Smart greenhouses
- Carbon-neutral homes
- Wearable health monitors

The proposed innovation is a direct eco-friendly replacement for glass that provides natural illumination during the day and privacy at night