High-Performance Electrochromic Devices

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Overview

Current electrochromic materials offer a broad color range and moderate electrochromic activity. However, real-world applications demand more intense coloration, faster switching times, and improved stability. To address these needs, new electrochromic materials have been developed and integrated into an optimized, fully automated spray-coating process for smart, color-changing surfaces. This controlled synthesis and coating method enables precise tuning of color palette, intensity, and reversibility, ensuring rapid response times and high color-switching efficiency. These advances position the technology as a strong candidate for high-performance electrochromic devices.

Applications

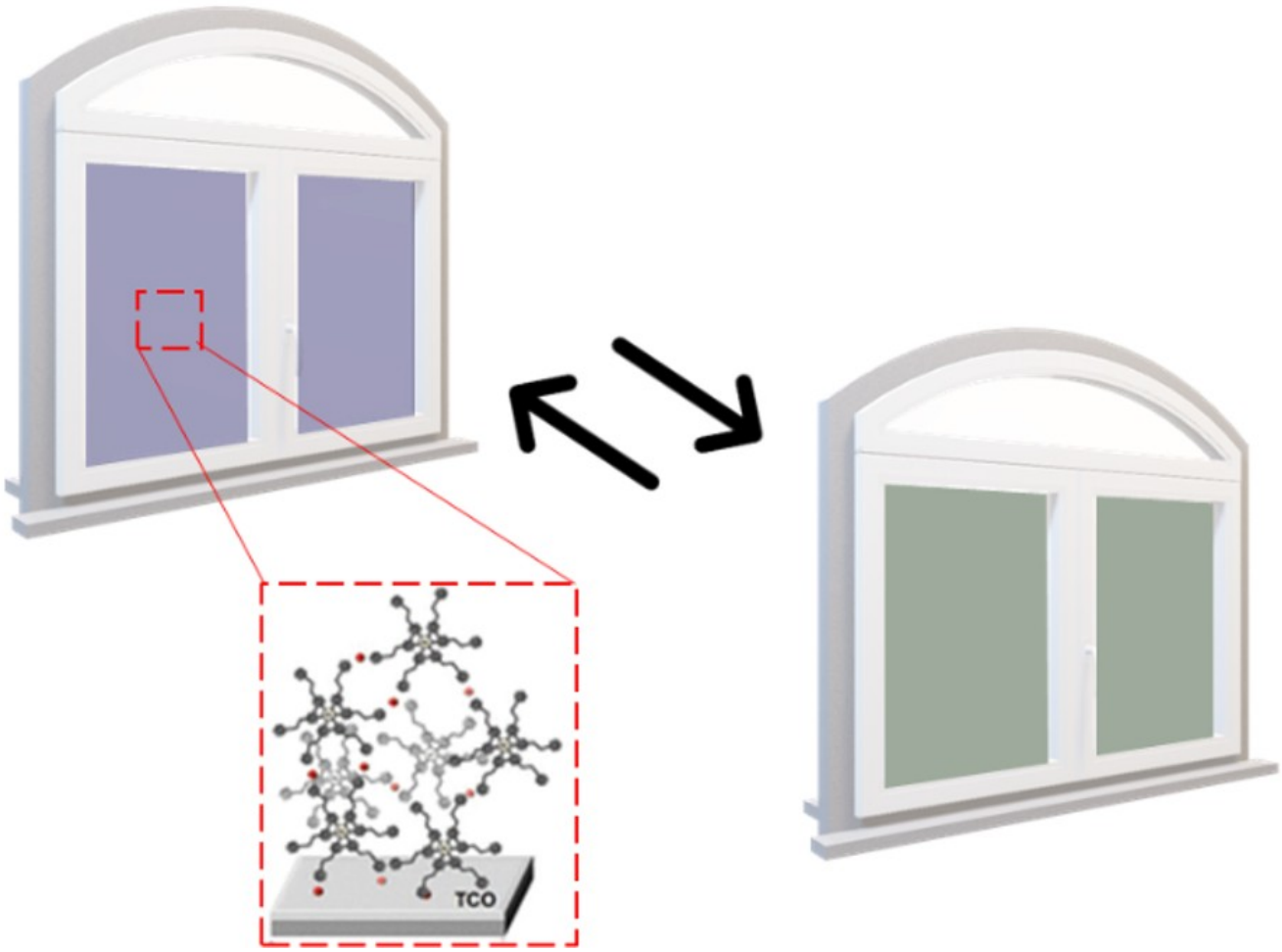
- Smart color-changing glass (windows/glasses/mirrors/windshields etc.)
- Color displays
- Electrochromic lenses and helmet-visors
- Wearables devices
- Electrochemical sensors

Differentiation

- Fully reversible optical responses
- Very high coloration efficiency
- Color tuning by synthetic means
- Automated spray-coating process
- Fast response times (~400 ms for >95%)

Development Stage

Electrochromic materials with a diverse color palette were demonstrated on a 6Ã—6 cm surface and integrated into an efficient, fully automated spray-coating process, enabling enhanced coloration control.



Reference

Malik et al., ACS Appl. Mater. Interfaces, 2019 [1].

Patent Status

USA Granted: 11,764,003 USA Granted: 9,847,494 USA Granted: 11,053,434