

Inventions & Innovation Project Abstract

Electrochromic Windows - Advanced Processing Technology

Sage Electrochromics, Inc. is developing advanced fabrication capabilities for energy-saving electrochromic (EC) smart windows. SAGE EC devices consist of an all-ceramic stack of thin-film coatings on a glass substrate. The window tint can be changed electrically by the application of low voltage DC power. SAGE has developed the basic materials and device technologies and moved operations from laboratory to pilot line. Currently, SAGE produces large size switchable glazings up to 0.5m². These EC windows modulate the solar energy entering a building and can be switched from greater than 60% to less than 5% visible light transmission.

Energy savings for buildings with EC windows have been estimated using the DOE 2.1E computer simulation analysis. Results indicated that significant energy reductions would be achieved over current high-performance static glazings. Additional benefits include glare reduction (while retaining the view) and increased thermal comfort, both of which contribute to the enhanced productivity of knowledge workers in buildings glazed with EC. While the fundamental technology to coat glass and assemble dual-pane units is well established, there are a number of process issues that must be addressed to consistently produce EC devices with high yields. These include the statistical optimization of deposition parameters, reduction of defects, and the incorporation of improved film patterning techniques. High product yields are required to achieve ultimate market penetration with total annual U.S. energy savings from EC windows estimated to be as high as 0.7 quads.



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