Composite electrochromic devices based on electro-explosion of wires and spray coating method.

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Abstract

In consideration of power-saving, electrochromic devices (ECDs) with the ability of screening sunlight can reduce the energy consumption of air-conditioner system significantly, especially for the "glass-rich" commercial buildings with abundant windows, have unlimited potential these days while the aggravating of global warming and the enhancement of people's awareness of environmental protection. By applying a small electrical potential to ECDs' two counter working electrode, the transmittance of electromagnetic wave with different wavelength can be altered correspondingly. There are some composite electrochromic devices were reported to have better performance than those composed of pure material. In previous work, our group had successfully made ECDs, constructed by tungsten trioxide nanoparticles (WO_3), by electro-explosion of wires (EEW) method and spray coating technology. In this work, we produced molybdenum trioxide (MoO_3) nanoparticles also by EEW, and based on the same technique the composite ECDs were fabricated in air. WO_3-based ECDs have been studied widely due to the excellent optical modulation and chemical stability, MoO3 also still stand in the ascendancy over the feature that it's working wavelength is the most sensitive to human being. Despite the MoO_3-based ECDs shows that fascinating characteristic, there are few kinds of drawbacks of this material: lower coloration efficiency and weaker adhesions on FTO. Hence, the composite ECDs was fabricated in this work with better performance by tuning the MoO_3/WO_3 to a specific ration.