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Carbon dots as liquid and gel-type electrolytes for high-performance electrochromic devices

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Carbon dots (C-dots) have attracted great attention because of their unique optical and electronic properties. Current applications of C-dots are mainly focused on bioimaging and biosensing relying on their optical properties, and only a few papers have been reported on C-dots for energy-harvesting such as capacitors or solar cells. Here, we report the utilization of nano-sized C-dots for a new type of solid electrolyte by incorporating metal counter cations (M⁺). C-dots synthesized by the top-down method, have polyanionic forms of oxygen-bearing functional groups on their surface exhibiting strong electrostatic interaction with metal counter cations. Composites of C-dots and various metal counter cations ((C-dots)-M^{x+}) were applied as electrolytes in various solvent conditions, and showed excellent performance over conventional supporting electrolytes. The (C-dots)-M^{x+} was then employed as liquid and gel electrolytes for electrochromic devices (ECDs), and the devices showed excellent electrochromism with fast response time, long lifetime, high coloration efficiency and low power consumption.

Biography

Eun Ji Park graduated from Soongsil University in South Korea (2016). She is undergoing a master's course in the electrochemistry laboratory of Soongsil University. Recently, she is doing experiment for electrochromic device using Carbon-dot electrolyte.

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