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DEVELOPMENT AND CHARECTERIZATION OF ELECTROCHROMIC DEVICES USING ANTHOCYANINE-BASED NATURAL PIGMENTS AND TiO₂

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Electrochromic devices have a wide range of applications in optical and communication industry, building industry, automobile industry and military industry. Most of the research in this field is based on device structures fabricated using synthesized organic/inorganic compounds. In this study we used a natural pigment and TiO_2 to produce a simple electrochromic device that has electrical and optical characteristics comparable to those made by more elaborate techniques.

In our work a conducting glass plate was (FTO) coated with the pigment (anthocyanine) extracted from 'Maha-Bowitiya' (*Melastoma malabathricum*) seeds by dipping the glass plate in the dye solution. A similar plate was coated with TiO₂. The two plates were pressed together using small clamps to form the electrochromic device. On application of about -2.0 V to the TiO₂ side, the device turned into whitish (transparent) colour and when the polarity was reversed it turned into a red colour. The optimum switching of colour was observed at 3.2 V. The switching time of the device was observed to be about 5 s which is comparable with that of similar devices made with more elaborate device structures using artificial dyes. The change of transmittance (ΔT %), in the visible region, between switching states was about 5%. The electrochromic behaviour of the device is due to the oxidation and reduction of the dye resulting from the electron transfer to and from TiO₂ under appropriate bias.

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