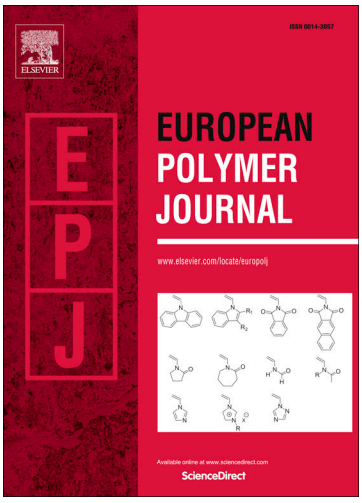

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Preparation of redox- and photo-responsive ferrocene- and azobenzene-based polymer films and their properties

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Abstract

A series of redox- and photo-responsive copolymers, poly(2-(methacryloyloxy)ethyl ferrocenecarboxylate-*co*-4-methacryloylamino-4'-nitroazobenzene) (P(FcEMA-*co*-MAAzo)s) were synthesized using free radical polymerization. The synthesized copolymers were characterized by ^{1}H NMR, FT-IR, gel permeation chromatography (GPC) and thermogravimetric analysis (TGA). Cyclic voltammetry (CV) and Ultraviolet-visible (UV-vis) absorption studies showed redox- and photo-responsive properties of the synthesized copolymers in the solution. P(FcEMA-*co*-MAAzo)s films were prepared by spin-coating or drop-coating method and these films were found to be redox- and photo-responsive. The color of the prepared films could be adjusted by the redox stimulus, while UV-vis absorption properties of the prepared films could be adjusted by changing wavelength of light. It was found that these synthesized films show potential application for high density information storage.

Key words: Ferrocene, azobenzene, film, redox- and photo-responsive, information storage

1. Introduction

In recent years, with the development of internet technology, there is a tremendous demand of data storage devices[1]. The polymer materials are the promising candidates for the next generation data storage devices due to their structural diversity, good flexibility and low cost[2, 3]. Thus, much attention has been paid to the research of data storage polymer materials[4, 5]. Among different kinds of polymer materials, redox- and photo-responsive materials are two kinds of most promising materials because of their fast, efficient and clean response behavior.

Ferrocene-based materials possess excellent (electro)chemical redox activity, thermal and

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