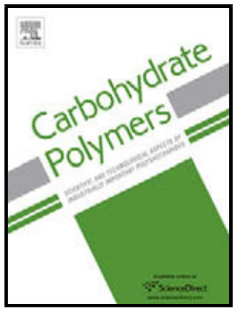

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Light-induced Surface Graft Polymerizations Initiated by An Anthraquinone Dye on Cotton Fibers

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ABSTRACT

Anthraquinone and its derivatives could serve as photo-sensitizers and generate radicals and reactive oxygen species in polymers under exposure of UVA or day light. Such a property was utilized in development of novel light-induced surface radical graft polymerizations on cotton fibers that were dyed with an anthraquinone derivative, 2-ethylanthraquinone. Several functional monomers were directly grafted onto the dyed cotton fibers upon UVA exposure. The chemical and morphological structures and thermal properties of the grafted fibers were confirmed and characterized by Fourier transform infrared spectrometer (FTIR), scanning electron microscope (SEM) and thermal gravimetric analysis (TGA). Reaction conditions including concentrations of the photosensitizer, the amount of monomers, as well as UVA irradiation time could influence grafting efficiencies. More interestingly, the surface graft polymerization did not significantly change the light active functions of the agent, evidenced by the light-active antimicrobial functions of the grafted fibers.

Keywords: Anthraquinone compounds; Light-induced grafting; Free-radical polymerization; Vat dye; Cotton fabric; Antimicrobial function.

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