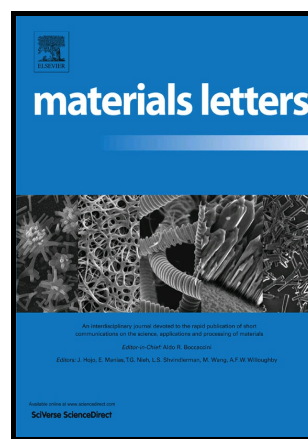


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Hydrothermal growth of reduced graphene oxide on cotton fabric for enhanced ultraviolet protection applications

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ABSTRACT

Reduced graphene oxide (rGO) was successfully deposited on the surface of cotton fabric by a hydrothermal method. Raman spectroscopy reveals that rGO contain sp^2 hybridized carbon atoms. Field-emission scanning electron microscopy image indicated the deposition of rGO on the cotton fabric. Elemental mapping analyses confirmed the uniform distribution and coating of rGO on the cotton fabric. Ultraviolet protection factor (UPF) of rGO-deposited fabric before and after laundering was 442.69 and 422.32 respectively, while the bare fabric had 7.83. Thus the durability of rGO-deposited cotton fabric was enhanced than the bare cotton fabric. The UV tests indicates that the fabric incorporating reduced graphene oxide could dramatically enhance the UV blocking property compared with bare cotton fiber.

Keywords: Hydrothermal method; Cotton fabric; rGO; Raman spectrum; UV protection factor.

INTRODUCTION

For the past several decades, cotton has been considered as the most promising material in various fields, such as protective clothing, medical textiles, sportswear and automotive textiles. It is more superior when comparing with other material, since it has the excellent comfort, softness and biodegradability [1]. Functionalization of cotton with nanosized material is used for stain resistance, antimicrobial, controlled hydrophilicity/hydrophobicity, antistatic, ultraviolet (UV) protective, wrinkle resistant and shrink-proof abilities [2].

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