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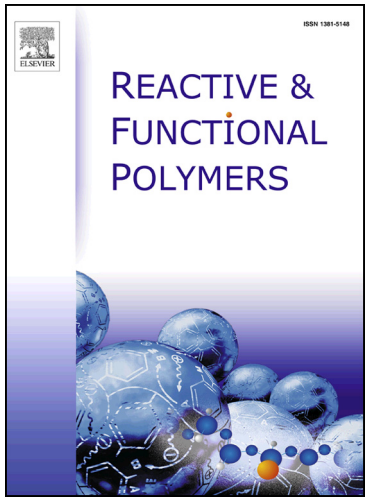

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Imidazolium salts grafted on cotton fibres for long-term antimicrobial activity

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Abstract

New antimicrobial (AM) coatings based on imidazolium salts have been prepared linking the imidazolium salts to the cotton fabric using siloxane oligomers as coupling agents. Three different imidazolium salts, linked to the siloxane oligomers connected to the cotton fabric either with ionic or covalent linkages, have been used. FTIR analysis shows that the imidazolium salts are linked to the cotton fabric. All the coatings prepared have high antimicrobial activity at both concentrations tested (3% and 10% wt) and against a Gram positive and a Gram negative bacterium. The AM activity is mainly retained after 4 cycles of washing.

Keywords: antimicrobial activity; imidazolium salt; cotton fibers; siloxane oligomers; surface grafting.

1. Introduction

It is well known [1-3] that polymeric materials are subjected to the influence of microorganisms such as microscopic mushrooms, actinomycetes or bacteria. The prevention of microbial attack on textiles has become increasingly important to consumers and textiles producers. Therefore, interests in antimicrobial fabric finishing have steadily increased over the last few years. The major classes of antimicrobial (AM) agents for textiles include organometallics, phenols, quaternary ammonium salt and organosilicones [1-7]. These finishes should have several important features: in particular should be durable and have selective activity toward undesirable organisms. In addition, antimicrobial agents must be safe for humans.

An interesting way to impart AM properties to polymeric materials consists in the grafting onto the surface of the polymeric material or of the natural fabric of polyorganosiloxanes coatings linked to biocides, such as for example 1,6 di(guanidinhydrochloride)hexane groups [8], oligomers on the basis of γ-aminopropyltriethoxysilane and bisphenols [9] and aminomethylenphosphonic ligands [10].