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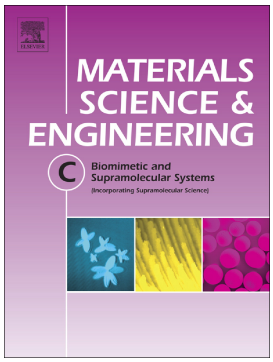

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Electrospinning of Ag Nanowires/polyvinyl alcohol hybrid nanofibers for their antibacterial properties

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ABSTRACT In order to developing a sort of flexible fibrous mats with outstanding and durable antibacterial activates, silver nanowires incorporated into polyvinyl alcohol (PVA) nanofibers were fabricated by electrospun method. Uniform Ag nanowires (NWs) were synthesized through a template-free method of solvothermal combined with polyol process, and then, they were dispersed in PVA solution. At last, Ag NWs embedded in PVA (Ag NWs/PVA) hybrid nanofibrous films were gained by electrospun of the mixed solution. The antibacterial activity of Ag NWs/PVA nanofibers against Escherichia coli (*E. coli*) and Staphylococcus aureus (*S. aureus*) was investigated by the methods of absorption and turbidity. Ag NWs with a mean diameter of 86 nm were demonstrated to be uniformly incorporated into PVA nanofibers, forming a core-sheath nanocable structure. The as-prepared flexible and free-standing Ag NWs/PVA nanofibrous films show outstanding antimicrobial activities against both *E. coli* and *S. aureus*. It's found that both matrix polymer of PVA and enrichment of active {111} facets present in Ag NWs are favorable for the antibacterial performance.

KEYWORDS Ag nanowires, electrospinning, nanofibers, PVA, antibacterial properties

Introduction

In recent years, the development of resistant bacteria to ordinary antibacterial agents has become a severe threat to public health. So, the research of new antibacterial agents has drawn intensive attention in the field [1]. Nanomaterials have attracted the widespread attention, since its unique physical and chemical performance. Among of them, metal and metal oxide nanomaterials have been already applied in the fields of biological medicine, photoelectron, photocatalysis, etc [2, 3]. In particular, the research of hybrid

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