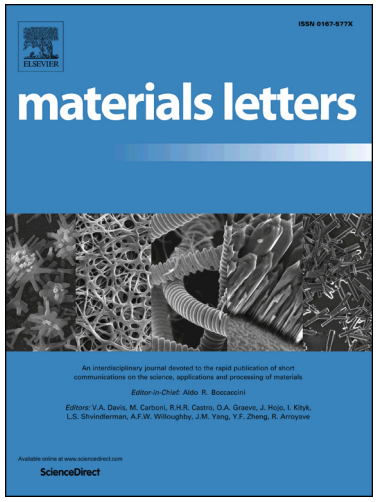

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Facile preparation of TiO_2/ZnO composite aerogel with excellent antibacterial activities

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Abstract

TiO_2/ZnO composite aerogel is synthesized using $Zn(NO_3)_2 \cdot H_2O$ and titanium butoxide as precursors through sol-gel route combined with C_2H_5OH superfluid drying technique. The effects of the Zn^{2+}/Ti^{4+} molar ratios and concentration on the antibacterial properties of TiO_2/ZnO composite aerogels are investigated. The results show that the specific surface area is as high as 180 m^2/g for the samples with the Zn^{2+}/Ti^{4+} molar ratios of 1.5. The composite aerogels have the maximum inhibition zone of 23 nm and 19.5 nm for *E. coli* and *S. aureus*, and the minimum inhibitory concentration for *E. coli* and *S. aureus* of 100 ppm.

Keywords: TiO_2; Nanocomposites; Composite materials; Sol-gel preparation; Antibacterial

1. Introduction

TiO_2 aerogels are novel antibacterial agent with excellent physicochemical stability, high specific area, high oxidation activity and non-toxic [1]. They have drawn great interests in a wide range of application prospects in antibacterial materials field [2]. However, the electrons can only be excited by absorbing ultraviolet light due to the band gap of TiO_2 is high (3.2 eV), which limits its wide range of application in photocatalysis and antibacterial [3, 4]. Thus, how to improve the antibacterial performance of TiO_2 have caused extensive concerns all over the world. Nano-ZnO is novel inorganic nanomaterials with excellent chemical stability, thermal stability and