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## A new large - Scale synthesis of magnesium oxide nanowires: Structural and antibacterial properties

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### Abstract

Large-scale one-dimensional magnesium oxide (MgO) nanowires with diameters of 6 nm and lengths of 10 μm have been successfully synthesized by a new facile and simple reaction. This production was performed via a microwave hydrothermal approach at low temperature growth of 180 degrees C for 30 min. The structure of as synthesized MgO nanowires were investigated by means of X-ray diffraction (X-ray), Fourier Transformation Infrared Spectroscopy (FTIR), Field Emission Scanning Electron Microscopy (FE-SEM), Transmission Electron Microscopy (TEM), Selected Area Electron Diffraction (SAED) and Energy Dispersive X-ray (EDS). The antibacterial behavior of MgO nanowires concentration in solid media against Gram negative and Gram positive for different bacteria has been tested in details. The results show that the MgO nanowires have bacteriostatic activity against Escherichia coli and Bacillus sp. The antibacterial activity increases with increasing MgO nanowires concentration. Furthermore, the presence of one-dimensional MgO nanowires has high antibacterial efficacy and damages the membrane wall of bacteria. Finally, this study offered the prospect of developing ultrafine nanoscale devices utilizing MgO nanowires and implementing their useful potential in biological control. (C) 2012 Elsevier Ltd. All rights reserved.

### Keywords

**Author Keywords:** Magnesium oxide; Nanowires; Microwave hydrothermal process; Structural; Antibacterial properties

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