A. A. Katbab et al., J Nanomedic Nanotechnol 3:1
doi: http://dx.doi.org/10.4172/2157-7439.S1.08

OMICS Group Conferences
Accelerating Scientific Discovery

International Conference and Exhibition on
Nanotechnology & Nanomedicine
March 12-14, 2012 Omaha Marriott, USA

TITLE

Nanobiocomposites with enhanced UV catalyzed antimicrobial activity and improved barrier based on nanoTiO2/ nanoclay hybrid and polyethylene

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Bionanotechnology deals with nanoscopic interactions between nanostructured materials and biological systems. Recently polymer nanocomposites with enhanced biocidal activity have attracted great attentions. Nanotitanium dioxide (TiO_2) is considered as an active nanofiller in manufacturing surgical devices and implants with antibacterial activity. Nano TiO_2 can also behave as photosensitizer for Polyethylene, hence makes the product photodegradable and photoactive towards various bacteries when irradiated by UV. However, nano TiO_2 can not improve barrier properties due to its low aspect ratio. In the present work, a hybrid system composed of nano TiO_2 and nanoclay with negatively charged silicate layers, has been incorporated into film grade polyethylene. Nanostructure has been tailored to maximize photocatalytic behavior for the deactivation of E-colie. Nanocomposites exhibited synergized antibacterial activity with enhanced barrier towards penetrating molecules. Nanocomposites showed also accelerated photodegradation when exposed to the solar light.

Keyword: Nanocomposites, NanoTiO_2, Nanoclay, Hybride, Antimicrobial, Polyethylene.

Biography

I received MSc and Ph.D degree in polymer engineering at Birmingham University of England. Academic activity was started in 1981 at polymer engineering department of Amirkabir University in Tehran. My main research activities have been focused on microstructure- properties correlation of polymer nanocomposites and nanobiomaterials. I am currently full professor at this department and published over 90 international papers.