OMICS International
conferenceseries.com
4th Global Summit on
Toxicology
August 24-26, 2015 Philadelphia, USA

Physicochemical transformations of ZnO nanoparticles under aging process in aquatic environment and the toxicity to green algae

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The increasing industrial use of manufactured nano materials (MNMs) during the last decades poses a potential threat to the environment and in particular to organisms living in the aquatic environment. To evaluate the ecological and human health risks of MNMs released to the environment properly, it is necessary to investigate the involved physicochemical transformations of MNMs under aging process in the environment and their toxicity to hydrophytes such as green algae. In the present study, the physicochemical changes of zinc oxide nanoparticles in aqueous media were characterized by SEM, TEM and XRD, and analyzed quantitatively by means of spectroscopic tools such as Raman and FTIR spectroscopy. The toxicity of zinc oxide nanoparticles under aging process in aqueous media was investigated in green algae *Chlorella vulgaris*. Our results confirmed the new compounds transformed in aging process which are identified as hydrozincite and zinc hydroxide, and revealed the lower toxicity of aged zinc oxide nanoparticles which is ascribed to the transformations of the aged zinc oxide nano particles. This work has therefore demonstrated the importance of consideration of aging process for evaluation of the toxicity of MNMs in aquatic surroundings.

Biography

Qing Huang has completed his PhD from University of Goettingen in Germany. He is now a Professor in biophysics, the Director of the Department of Physical Biology, Hefei Institute of Physical Science, Chinese Academy of Sciences. He has published more than 80 papers in reputed journals such as *J. Am. Chem. Soc., Adv. Mater., Adv. Funt. Mater., Chem. Commun., J. Hazard. Mater., Environ. Sci. Tech., Water Res.* and etc. He has served as the reviewers for many international journals, and an expert member for Chinese National Natural Science Foundation.

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