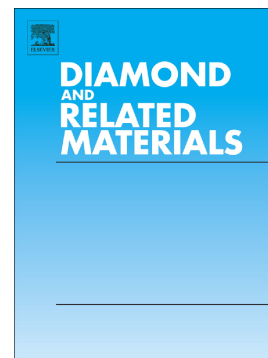


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Sonocatalytic degradation of organic pollutant by SnO₂/MWCNT nanocompositeSher Zaman*^{1,2}, Kai Zhang³, Abdul Karim¹, Jianguo Xin², Teng Sun², Jian Ru Gong*³¹ Department of Physics, Karakorum International University, Gilgit, 15100, Pakistan² Research Centre for Laser Technology and Applications, School of Optoelectronics, Beijing Institute of Technology, Beijing 100081, China³ Chinese Academy of Sciences (CAS) Key Laboratory of Nanosystem and Hierarchy Fabrication, CAS Center for Excellence in Nanoscience, National Center for Nanoscience and Technology, Beijing 100190, China***Corresponding Authors**

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Abstract

Developing highly active catalysts is central to sonocatalytic degradation of organic pollutants. In this work, efficient sonocatalytic degradation of organic pollutants is achieved using a novel sonocatalyst-SnO₂/multiwall carbon nanotube (MWCNT) nanocomposite. By taking methylene blue (MB) as a model pollutant, almost complete degradation is obtained over the SnO₂/MWCNT nanocomposite with high rate constant, while the bared SnO₂ and the mechanical mixture of SnO₂ and MWCNT show inferior sonocatalytic performance. The results indicate that the SnO₂/MWCNT nanocomposite can efficiently utilize the light emitted during bubble collapse, promote separation of electron-hole pairs as well as transfer of electrons from SnO₂ to MWCNT, due to the synergistic effect of SnO₂ and MWCNT, thus leading to much higher sonocatalytic activity. The current work paves a way for preparing highly efficient sonocatalysts with carbon nanotube as an excellent electron sink.

Keywords: Sonocatalysis, Nanocomposite, Carbon nanotube, Tin dioxide, Organic pollutant degradation

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