

TiO₂ Adsorbed on Cement Balls for Effective Photomineralization of Organic Pollutants under UV Light Irradiation

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Abstract : Organic pollutants like phenols and organic dyes present in industrial waste water are posing a hazardous threat to aquatic ecosystem. Several measures have been adopted for the neutralization and photodecomposition of these harmful organic moieties, among these semiconductor photocatalysis has been provided a major thrust after the discovery of Honda-Fujishima effect. Present study demonstrates the adsorption of TiO₂- P25 in nano size (~36 nm) on cement balls for effective photodegradation of Alizarin and penta chlorophenol (PCP) under UV light illumination. Triton-X was used as a stabilizer for effective adsorption of TiO₂ on cement balls (TCB) followed by calcination at ~300°C for 4 h. The TCB's were dispersed randomly in a self designed reactor for photocatalytic performance as shown in scheme 1. The change in concentration of alizarin and PCP was observed under UV-Vis spectroscopy, PCP was detoxified within 40 min while alizarin photodecomposed within 15 min of UV light irradiation. Taking into consideration the go green slogan and future prospective this technique can be also utilized under visible light and on mass scale because this is an effective tool for environmental remediation and waste water treatment.

Keywords : organic pollutants, TiO₂ cement balls, photodegradation, UV light irradiation

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