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Hadi Ahmari, Saeed Zeinali Heris, Mohammad Hassanzadeh Khayyat



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Experimental investigation of new photocatalytic continuous coaxial cylinder reactor for elimination of linear alkylbenzene sulfonic acid from waste water using nanotechnology

Hadi Ahmari^{1,2}, Saeed Zeinali Heris^{1,3}, and

Mohammad Hassanzadeh Khayyat⁴

¹*Chemical Engineering Department, Faculty of Engineering, Ferdowsi University of Mashhad, Mashhad, Iran*

²*Department of Chemical Engineering, Quchan Branch, Islamic Azad University, Quchan, Iran*

³*Faculty of Chemical and Petroleum Engineering, University of Tabriz, Tabriz, Iran*

⁴*Pharmaceutical Sciences Research Center, Department of Pharmaceutical Chemistry, University of Medical Sciences, Mashhad, Iran*

ABSTRACT

In this research, TiO₂/UV photocatalytic degradation of linear alkylbenzene sulfonic acid (LAS) was examined in aqueous solution. The process was performed in a continuous reactor with coaxial cylinders. The nanoparticles were deposited on two natural polymer bases, cotton and wool. The inner cylinder of the polymer textile was covered. The contaminant solution was passed through cylinders. The removal process of photocatalytic LAS was more efficient than the UV irradiation. Wool base illustrated more significant removal efficiency than cotton base. The system was able to remove 86% of pollutants in approximately 100 min. The reactor could work with either the recycle flow or greater residence time. It was concluded that there was slight difference between increasing the residence time of contaminant solution in a single pass of reactor and the recycling flow.

Keywords: TiO₂ nanoparticles; Environmental catalysis; continuous coaxial cylinders reactor; photo degradation; LAS

*Address correspondence to S. Zeinali Heris, E-mail: s.zeinali@tabrizu.ac.ir

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