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Using of microbial cellulose as a biopolymer for photocatalytic degradation of toluene vapors

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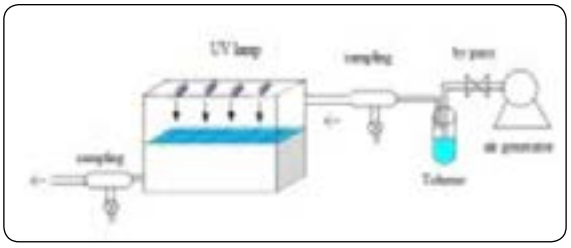
The high amount of Toluene exposure in various related jobs has caused so significant harmful health effect on people that plenty of investigations have so far been done to control and reduce its vapour production in the workplaces. In order to remove toluene from air, it is also suggested in this investigation to use a complex system of Nanoparticles of titanium dioxide embedded on adsorbent bed made by Microbial cellulose and exposing them by ultraviolet radiation (UV-A and UV-C). To verify the performance of the TiO_2 Nanoparticles as a strong photocatalyst, it was intended to survey the measuring of degradation of toluene in various conditions. In this study 50-400ppm of toluene concentration was investigated with a current of 0.2 L/min. Characteristics of Microbial cellulose after drying has surveyed by Scanning Electronic Microscope and measuring of its BET. Cellulose produced by Acetobacter xylinum is chemically pure, free of lignin and hemicelluloses and has a high purity and high degree of polymerization that distinguish it from other forms of cellulose The study demonstrated that the TiO_2/Microbial Cellulose catalyst may be a practical and promising way to degrade the toluene under ultraviolet irradiation. The results indicated that the rate of the photocatalytic process increased with increasing the intensity of UV irradiation. Using the combination of UV-A and UV-C lamps, the decomposition rate of toluene was 92%. Decreasing in distance between UV lamps and Photocatalyst source caused increasing of toluene removal. Microbial cellulose after drying by Microwave radiation can used as an adsorbent with good characteristics in its purity and adsorption of toluene vapors.



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Biography

Engineer Morteza seyfimejdar is studying in environmental health engineering at the Tehran University of Medical Sciences. He also works as an advisor in the technical department at Imenfarayandasia Co. manforayand. Morteza as a researcher, is interested in environmental issues and the removal of pollutants from urban and industrial air. The present study is the result of a research project at Tehran University of Medical Sciences has done with cooperation Imenfarayandasia Co.

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