

عنوان مقاله:

A new analytical method based on bismuth oxide-fullerene nanoparticles and photocatalytic oxidation technique for toluene removal from workplace air

محل انتشار:

فصلنامه روش های تجزیه در شیمی محیط زیست، دوره 2، شماره 1 (سال: 1398)

تعداد صفحات اصل مقاله: 14

نویسندگان:

Cobra Jamshidzadeh - *Occupational Health Engineering Department, School of Public Health, Kerman University of Medical Sciences, Kerman, Iran*

Hamid Shirkhanloo - *Research Institute of Petroleum Industry, West Entrance Blvd., Olympic Village, P.O. Box: ۱۴۸۵۷-۳۳۱۱۱, Tehran*

خلاصه مقاله:

A new sorbent based on mixture of bismuth oxide-fullerene nanoparticles ($\text{Bi}_2\text{O}_3\text{-NF}$) was used for degradation/removal of toluene from workplace and artificial air by UV-photocatalytic oxidation method (UV-PCOM). By set up of pilot, standard gas of toluene was generated with difference concentrations, and then was passed through UV lamp-glass quartz cell accessory (UV-GQC) by SKC pump at optimized flow rate. Following the UV irradiation, the electrons and holes can undergo redox reactions with toluene on the Bi_2O_3 surface that lead to the formation of toluene intermediates and toluene. Toluene and intermediates was physically and radically absorbed on the 200 mg of NF at room temperature and then, desorbed from it at 185 °C before determined by GC/FID. In optimized conditions, the adsorption capacity and removal efficiency of NF were obtained 212 mg g⁻¹ and more than 95%, respectively. The chemical absorption mechanism of toluene on NF was mainly obtained due to radical group of NF ($\text{OH}\cdot, \text{CO}\cdot$) with methyl of toluene (CH_3) and physical adsorption depend on characterization of NF. In addition the flow rate and temperature had highly impact on NF for removal efficiency and absorption capacity of toluene from workplace and artificial air.

کلمات کلیدی:

Toluene, Air removal, Bismuth oxide nanoparticles, bulky fullerene nanoparticles, UV-photocatalytic, Solid gas phase extraction

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/991036>

