12th International Conference on

ENVIRONMENTAL TOXICOLOGY AND ECOLOGICAL RISK ASSESSMENT

October 19-20, 2017 | Atlanta, USA

Preparation and characterization of TiO₂ nanofibers by hydrothermal method for removal of benzodiazepines (diazepam) from liquids as catalytic ozonation and adsorption processes

Vinod Kumar Gupta University of Johannesburg, South Africa

 T_{iO_2} nanofibers were synthesized by hydrothermal method and characterized by X-ray diffraction (XRD), field-emission scanning electron microscopy (FE-SEM), transmission electron microscopy (TEM). The specific surface area of the nanofibers was determined using the Brunauer–Emmett–Teller (BET) method. The value of specific surface area was 67.89 m²g⁻¹ for TiO₂ nanofibers. The aim of this study was to evaluate the effectiveness of TiO₂ nanofibers in removal of diazepam from water solutions. The maximum adsorption capacity occurred in diazepam concentration of 20 mg/l, contact times of 60 minutes, pH=6 and adsorbent mass of 0.09 mg/L. The result of the Langmuir and Freundlich isotherm study shows that of TiO₂ nanofibers behave more like Langmuir isotherm model. The adsorption process was exothermic and TiO₂ nanofibers follow the pseudo second order kinetic model and the other adsorbent follows the pseudo first order kinetic model. Since TiO₂ nanofibers are available and affordable and according to this study have high capacity for removal of diazepam. Finally, the catalytic ability of TiO₂ nanofibers was investigated for catalytic ozonation of diazepam. Results showed that TiO₂ nanofibers have high efficiency in catalytic ozonation of diazepam.

vinodg@uj.ac.za