EXPERIMENTAL STUDY OF ODOROUS ESTER PHOTOCATALYSIS

Emmanuel Gauthier¹,²,³*, Cécile Boyer¹, Pierre-Xavier Thivel¹, Françoise Delpech¹, Jean-Claude Roux⁴

¹ GRECA, Université Joseph Fourier, EA 3743, 39 Boulevard Gambetta, 38000 Grenoble, France; ² TERA Environnement, 60 Chemin des Fontaines, BERNIN, 38926 Crolles Cedex, France; ³ NATURAMOLE, Z.A. du Villaret, 38350 Susville, France; ⁴ EFPG, Institut National Polytechnique de Grenoble, UMR 5518, BP 65, 38402 Saint Martin d’Hères, France

Abstract

Titanium dioxide photocatalysis is an emerging and very promising technology to reduce odorous industrial pollution. Our project deals with industrial emissions that contain high concentration of ethyl hexanoate: this organic compound has a very low olfactory detection threshold and it is very unpleasant when it is both in industrial indoor air and in outer emission.

The main objective of this study is the determination of various parameters effects such as moisture inflow, pollutants concentration and photocatalyst nature on adsorption and photocatalysis. Adsorption capacity of the media used range between 9 to 18 mg EH per gram of media. It decreases while the relative humidity increases (competition between water and pollutant on photocatalyst sites). Moreover conversion rate observed to 60% of relative humidity increases with inlet concentration’s decrease. For an inlet concentration, it exists an optimal relative humidity for an optimal conversion rate. The photoproducts of ethyl hexanoate are also identified.

Keywords: photocatalysis, titanium dioxide, ethylhexanoate

* Author to whom all correspondence should be addressed: Phone: 0033 456520292, Fax: 0033 456520295, e-mail: Emmanuel.Gauthier@ujf-grenoble.fr