

# Different families of volatile organic compounds pollution control by microporous carbons in temperature swing adsorption processes

Shivaji G. Ramalingama\*, Pascaline Prea, Sylvain Giraudet<sup>b,c</sup>, Laurence Le Coqa,

Pierre Le Cloirec<sup>b,c</sup>, Olivier Baudouin<sup>d</sup>, Stephane Dechelotted

<sup>a</sup> Ecole des Mines de Nantes, GEPEA, UMR-CNRS 6144, 4 rue Alfred Kastler, BP20722, 44307 Nantes, Cedex 03, France

<sup>b</sup> Ecole Nationale Supérieure de Chimie de Rennes, CNRS, UMR 6226, Avenue du General Leclerc, CS 50837 35708 Rennes, Cedex 7, France

<sup>c</sup> Université Européenne de Bretagne, France

<sup>d</sup> PROSIM, Stratege Bâtiment A, BP 27210, F-31672 Labege, Cedex, France

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## abstract

In this research work, the three different VOCs such as acetone, dichloromethane and ethyl formate (with corresponding families like ketone, halogenated-organic, ester) are recovered by using temperature swing adsorption (TSA) process. The vapors of these selected VOCs are adsorbed on a microporous activated carbon. After adsorption step, they are regenerated under the same operating conditions by hot nitrogen regeneration. In each case of regeneration, Factorial Experimental Design (FED) tool had been used to optimize the temperature, and the superficial velocity of the nitrogen for achieving maximum regeneration efficiency (RE) at an optimized operating cost (OPD). All the experimental results of adsorption step and hot nitrogen regeneration step had been validated by the simulation model PROSIM. The average error percentage between the simulation and experiment based on the mass of adsorption of dichloromethane was 3.1%. The average error percentages between the simulations and experiments based on the mass of dichloromethane regenerated by nitrogen regeneration were 4.5%.