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Two PhD positions open from September 2009

PhD/3 years: Adsorption of organic mixtures by Metal Organic Frameworks

The understanding of the adsorption of polar and non polar liquids on the surface of adsorbents can be of great interest with respect to applications in separation processes. The aim of this PhD is a better understanding of the influence of structure and surface chemistry of Metal Organic Frameworks on their ability to separate organic mixtures, polar or non-polar.

This is mainly a thermodynamic and kinetic study based on adsorption isotherms and microcalorimetry. Complementary analysis of the systems will be carried out by spectroscopic methods as well as by in situ time-resolved diffraction with intense X-ray radiation (Synchrotron), which is particularly interesting in the case of these 'breathing' materials.

This study will be carried out in the framework of a European project "Macademia" which is coordinated by TOTAL. The project will be co-supervised by Isabelle Beurroies and Renaud Denoyel.

PhD/3 years: Dynamic gas adsorption calorimetry experiments

The separation of gas mixtures is often carried out using dynamic set-ups in which the gas mixture flows through a bed of adsorbent material. The aim of this PhD is to develop a flow system in which breakthrough curves will be obtained simultaneously with energetic information via calorimetry. A set-up for such experiments exists in the laboratory to which works at 0.1 MPa and one of the aims of this work will be to develop a second apparatus to work at higher pressures (1 MPa for example). The study will then be devoted to the understanding of the mechanisms at play for mixture adsorption on novel adsorbent materials developed in the framework of a European sponsored project Macademia' which is coordinated by TOTAL. The project will be cosupervised by Christelle Vagner and Philip Llewellyn.

This position will be open from September 2009.