微奈米孔隙材料模擬與應用實驗室

Micro/Nanoporous Materials Simulation And Applications Laboratory

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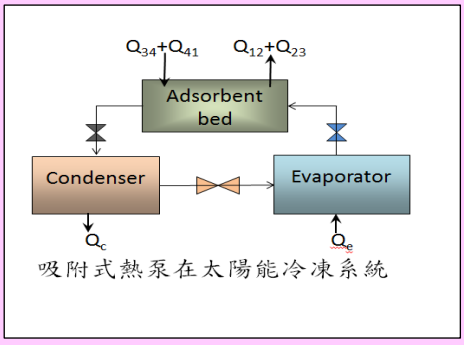
研究目的： 本研究室以無機、有機、生化和天然等原料，採用單一或複合配方製成特殊性能材料，進行氣體、溶液和電化學等吸附研究，針對材料的微觀結構、物理和化學性質之觀測，探討吸附動力學和等溫平衡，吸附程序之質量傳送與熱力學係數，謀求微孔材料實際應用推廣和設計基礎。

研究方法

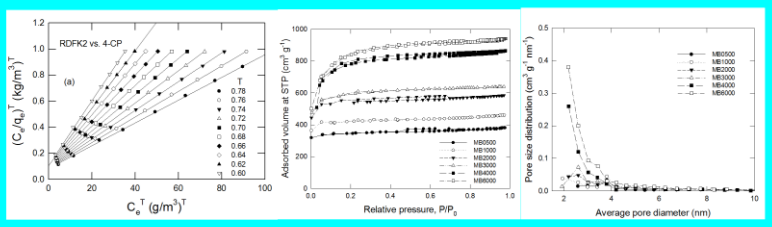
♦原料經由製備和活化技術，製成微奈米多孔物質，以 BET 孔隙分析、熱重分析、FTIR、掃描式電子顯微鏡(SEM)、元素分析等測試，瞭解材料之孔隙性質。進行吸附動力學和等溫平衡實驗，經由理論模式解析，提供材料吸附模擬和應用的性能。



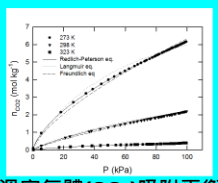
吸附式熱泵在太陽能冷凍系統

未來發展方向

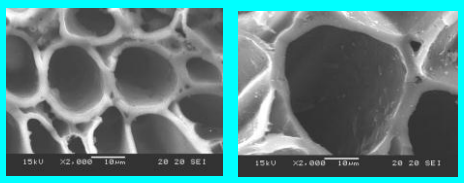
- ***利用統計學、熱力學和動力學等基礎理論，闡述微奈米多孔材料吸附模式和特性***
- ***模擬各種吸附機構在吸附式熱泵操作與節能***
- ***探討多孔材料和光觸媒在新興污染物之去除機制***



模擬最佳吸附 Toth 模式　　活性碳於 77K 之 N_2 吸脫附曲線、孔隙容積分佈



溫室氣體(CO_2)吸附平衡模式



活性碳之 SEM 圖

重要研究成果

A novel approach to characterizing liquid-phase adsorption on highly porous activated carbons using the Toth equation,	Chemical Engineering Journal
A new linear form of Redlich-Peterson isotherm equation for the adsorptions of dyes,	Chemical Engineering Journal
Initial behavior of intraparticle diffusion model used in the description of adsorption kinetics,	Chemical Engineering Journal
Characteristics of Elovich equation used for the analysis of adsorption kinetics in dye-chitosan systems,	Chemical Engineering Journal
Characteristics of pseudo-second-order kinetic model for liquid-phase adsorption: A Mini-review,	Chemical Engineering Journal
Analyzing a liquid-solid phase countercurrent two- and three-stage adsorption process with the Freundlich equation,	J. Hazard. Mater