



講者簡歷

一、基本資料

姓名：陳鈞振 (Jiun-Jen Chen)

服務機關/職稱：工業技術研究院 綠能與環境研究所/研究員

電話/e-mail: (03)5917468/jiunjenchen@itri.org.tw

二、學歷

2000/06~2004/09 台灣大學化學工程學系 學士

2004/09~2006/06 台灣大學化學工程研究所 碩士

2006/09~2012/09 台灣大學化學工程研究所 博士

三、經歷

2013/12~ 工研院 研究員

2014/01~2014/12 工研院構想前瞻計畫 主持人

2016/11~2017/11 美國加州大學柏克萊分校化學系 訪問學者

2018/01~ 經濟部研究機構能源科技專案 協同主持人

四、研究領域

光觸媒水分解產氫

金屬有機骨架多孔材料用於各種氣體吸附

五、獎項及榮譽

2016 台灣冷凍空調學會 工程論文獎

2016 工研院 專利地圖競賽 冠軍

演講摘要

Industrial application of porous metal-organic frameworks

Jiun-Jen Chen

Green Energy and Environment Research Laboratories, Industrial Technology Research Institute,

Hsinchu 31040, Taiwan

JiunJenChen@itri.org.tw

Abstract

During the past few decades, there has been enormous progress in research on the synthesis and applications of metal organic frameworks (MOFs), which are also known as porous coordination polymers. MOFs are crystalline materials which can be readily self-assembled from metal ions or metal clusters with organic ligands. The combination of various metal ions/clusters and ligands has led to a diverse range of MOF structures. Due to their outstanding properties such as uniform pore size, high internal surface area (up to about 10000 m²/g) and ultrahigh porosity (up to 90% free volume), the use of MOFs in various applications, for example, gas capture, storage, separation, sensing and catalyst is being explored.

In the first part of this talk, diamine-appended MOFs used as CO₂ adsorbents will be discussed. The attachment of alkyldiamines to coordinatively unsaturated metal sites of selected MOFs has been demonstrated as a simple methodology for increasing low pressure CO₂ adsorption selectivity and capacity. The step-shaped adsorption isotherms of this functionalized MOFs are the product of an unprecedented cooperative process in which CO₂ molecules insert into metal-amine bonds, inducing a reorganization of the amines into well-ordered chains of ammonium carbamate. In the second part, we'll talk about the perspectives and commercial developments of MOFs. From an industrial point of view, low-cost raw material, structure stability, large scale production and shaping are more critical issues. Finally, the progress of MOF research work in ITRI, especially using MOFs for dehumidification will be presented as well.

Keywords porous material, metal organic framework, CO₂ capture, dehumidification