# 鉛離子與鋅離子於咖啡渣表面之吸附研究 = Adsorption of lead and Zinc ions onto the surface of coffee residues


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**摘 要**

本研究是利用已被沖泡使用過的咖啡渣來吸附水中重金屬鉛離子(Pb2+)及鋅離子(Zn2+)，研究分為兩階段，第一階段以批次試驗探討影響吸附的參數，主要項目為吸附劑劑量(1.0、2.0、3.0、4.0 g/L)、吸附質濃度(10、20、40、80 mg/L)、pH值(pH 3、4、5)與溫度(15、25、35、45、55℃)對鉛、鋅金屬吸附之影響，再進行等溫吸附試驗，探討最大吸附量與吸附關係；第二階段則藉由批次試驗實驗數據，推估出吸附動力學模式(Bangham's equation、Pseudo-first-order kinetic model、Pseudo-second-order kinetic model及Intrapariticle diffusion model)、吸附熱力學與等溫吸附模式(Freundlich、Langmuir、Redlich-Peterson、Dubinin-Radushkevich及Tempkin)，再將數學模式模擬所得之結果，來解析咖啡渣對鉛、鋅離子吸附機制。實驗結果顯示鉛、鋅離子之動力學模式皆與Pseudo-second-order kinetic model較相符，平衡吸附模式則皆符合Langmuir線性回歸模擬。由Langmuir等溫式算出，咖啡渣吸附鉛與鋅之最大吸附量55℃時各為29.2(mg/g)與12.8(mg/g)。吸附熱力學算出鉛、鋅離子之ΔH°(13.8、10.6 kJ/mol)與ΔS°(0.07、0.04 kJ/mol．K)皆為正值，表此吸附為吸熱且自發性之物理吸附。



關鍵詞 : 吸附、咖啡渣、鉛、鋅


**目錄**



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