利用火力發電廠燃煤底灰去除染料廢水色度之研究

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摘 要

本研究係利用火力發電廠廢棄材料 ” 底灰 ” 作為吸附劑以去除水溶液中的 Reactive Red 198（R-R198）與Reactive Black 5（R-Bk5）兩種染料。 於批次吸附研究中，其包含pH值、吸附質濃度、篩網大小、吸附劑量、溫度等影響之探討。 而動力學研究、熱力學研究與管柱操作也用來解析染料去除之研究。結果發現染料去除百 分比隨著初始染料濃度的降低而增加，且隨著吸附劑使用量的增加而增加。此外，利用擬 一階、擬二階與Bangham模式來解析底灰吸附染料之動力學研究，結果顯示吸附過程是遵循 擬二階動力模式。而平衡吸附等溫線係藉由Freundlich、Dubnin-Radushkevich、Langmuir、 Temkin 和 Redlich-Peterson等溫線方程式利用相關係數與五種不同誤差函數來分析。結果顯 示Langmuir方程式為最適代表染料R-R198與R-Bk5對底灰吸附系統之平衡數據。對於熱力學研 究則顯示，底灰對R-R198與R-Bk5兩種染料之吸附行為為自發性吸熱反應。再者，有關吸附管 柱之設計係利用規模放大法（Scale-up approach）與動力學法進行不同流速、吸附質濃度與 吸附劑量影響之探討。綜合以上實驗結果可知，未經過前處理的底灰因具有高表面積、孔洞 體積與孔徑大小，顯示利用底灰作為去除染料R-R198與R-Bk5之吸附劑是 具有發展潛力的。

關鍵詞 : 吸附 ; 底灰 ; 色度去除 ; 動力學 ; 管柱

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