紫外光/二氧化鈦/超音波程序對染整廢水處理之研究 = Decolorization of Textile Wastewater by The Hybird UV/TiO2/Ultrasound..

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摘 要

本研究以紫外光/二氧化鈦(UV/TiO2)為實驗基礎，並結合震盪式超音波(ultrasonic bath, USB)及探針式超音波(ultrasonic probe, USP)，對染整廢水之處理進行脫色研究，以了解光催化處理染整廢水之可行性及結合超音波是否能增加反應速率。本研究之目標污染物為C.I. Reactive Red 2 (RR2)，探討參數包含染料初始濃度、TiO2劑量、溶液pH值、燈光波長及結合USB及USP。 實驗結果顯示降解速率隨初始濃度和pH值下降而增加；研究發現TiO2最適添加量為 2 g/L，脫色反應符合擬一階反應速率式；降解速率以波長254 mn之UV照射高於365 nm；此外溶液中添加鹽類對UV/TiO2程序的降解能力具促進效果。 脫色速率呈現UV/TiO2/USB/USP > UV/TiO2/USB > UV/TiO2/USP > UV/TiO2，由實驗數據可知USB和USP系統有助於增加UV/TiO2之降解速率。光催化實驗中，以UV/TiO2/USB/USP具有最佳之光降解效果，反應時間經過120 min，於254 nm UV照射下，可達到約80%之脫色效率。C2H5OH添加對UV/TiO2相關系統造成明顯之抑制效應，實驗結果推測氫氧自由基是主要氧化有機物之物種，但反應速率並未因C2H5OH添加而完全停止，故電洞之氧化能力於UV/TiO2相關系統中亦扮演重要之角色。

關鍵詞 : 二氧化鈦 ; 超音波 ; 可行性 ; 速率式 ; 紫外光

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