比較不同鑲嵌元素之二氧化鈦光觸媒在可見光下對染料溶液的反應行為之研究

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摘 要

本研究以溶膠凝膠法(sol gel)製備不同的二氧化鈦光觸媒，以鑲嵌氮、硫和鐵的方式進行改質二氧化鈦光觸媒，並鑲嵌於基材Al2O3上，包括N/TiO2/ Al2O3、S/TiO2/ Al2O3、Fe/TiO2/ Al2O3，在可見光下進行AR27、MG、MO、AR4染料的降解實驗；並探討最佳的改質條件(鑲嵌劑量和添加量)。 本實驗利用BET、SEM/EDX、XRD與UV-vis等儀器鑑定光觸媒之物化特性。實驗結果顯示，以本實驗的改質方法確實能成功將非金屬氮、硫與金屬鐵鑲嵌於TiO2/Al2O3上，比表面積大約為26.86~38.25m2/g，XRD結果顯示晶型以銳鈦礦為主，在UV-vis結果顯示Fe/ TiO2/Al2O3具有明顯的紅位移現象。若觀察AR27、MG、MO、AR4染料降解情形，並以擬一階反應速率方程式來描述實驗結果，可發現改質後的二氧化鈦光觸媒，光觸媒的添加量會隨不同的光觸媒及不同染料有不同的效果；改質光觸媒的鑲嵌劑量以低劑量為較好；改質光觸媒在可見光下具有較佳的光降解效果，其中有以鑲嵌非金屬的光觸媒具有較佳的光降解效果。

關鍵詞 : 光觸媒、可見光、氮、硫、鐵、二氧化鈦、AR27、MG、MO、AR4染料

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