改良型二氧化鈦光觸媒還原水中硝酸鹽之研究

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摘 要

本研究利用光催化合成法製作成改良型光觸媒，將鑲有Ag、Cu金屬之二氧化鈦（TiO2）鑲嵌於基材Al2O3上，並以水中硝酸鹽進行光還原實驗。 本實驗利用ICP-AES、BET、SEM/EDX與XRD等儀器鑑定光觸媒之物化特性，並以硝酸鹽進行光還原實驗。實驗結果顯示，改質光觸媒之比表面積 112~170 m2/g，TiO2晶型大都以銳鈦礦呈現。觀察硝酸鹽被光還原之情形，以Langmuir-Hinshelwood反應動力模式描述實驗結果，發現改質光觸媒利用氧化還原電位之特性使硝酸鹽被光還原的效能提升；含Cu之改質光觸媒的還原效果最好，轉化效率達99%，其它最佳操作條件為pH3，光觸媒量為 0.1g/L，犧牲劑為甲酸。本實驗發現硝酸鹽被轉化之中間生成物含有亞硝酸鹽、氨氮及尿素，而亞硝酸鹽的生成將影?氨氮和尿素的濃度變化。 此外，本研究證實節能性光觸媒BaF2/TiO2/Al2O3可有效捕捉幅射線並進行光還原硝酸鹽反應，硝酸鹽之轉化率達10%。

關鍵詞 : 光還原 ; 光觸媒 ; Al2O3 ; 硝酸鹽 ; 尿素 ; 反應動力模式

目錄

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