以催化臭氧程序處理含有機物廢水之質傳與反應行為研究

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摘 要

中文摘要 臭氧程序在水溶液系統之污染物處理的應用中，臭氧質傳與自解對有機物的去除反應有相當大的影響。為瞭解催化式臭氧程序反應系統中觸媒對於臭氧之質傳係數、自解速率常數和反應速率常數的影響，本實驗使用Al2O3、MnO2、SiO2和PAC四種觸媒，在不同反應條件下，分別進行單純臭氧自解與質傳，以及在含有機物(Red 4染料)之氧化反應實驗，於催化式臭氧系統中探討不同觸媒在不同操作條件下，對染料去除行為之影響。 實驗結果顯示各類觸媒之添加對於臭氧之質傳係數略有增加，臭氧自解速率常數以添加PAC時有最佳促進效果。在本研究範圍內，觸媒劑量對於臭氧質傳係數之促進影響不大，但對臭氧自解常數而言，Al2O3與PAC之劑量效應對於臭氧質傳係數之促進情形較為明顯。在低pH條件下，MnO2觸媒對臭氧之促進質傳較為明顯，添加MnO2時，臭氧之質傳係數KLa值約為0.5488min-1，其質傳效果隨pH之升高而降低。PAC觸媒對臭氧之自解反應速率之影響較其他觸媒更為明顯，臭氧自解之速率隨pH值增高而增加，在pH9添加PAC時，臭氧的自解速率常數kd值約為2.3141 min-1。 實驗發現，以PAC觸媒對增進Red 4脫色反應速率之效率最佳，其餘各類觸媒劑量之增加對於Red 4反應速率之促進並不明顯，在高pH值下觸媒之添加可增加Red 4染料之反應速率，顯示臭氧可藉由觸媒之添加，提升OH・與Red 4之間接氧化作用。本研究提出三種反應模式，可合理說明臭氧結合不同觸媒時，對於水中有機物臭氧化反應機制與反應行為之影響。

關鍵詞 : 質傳係數 ; 自解 ; 臭氧 ; 催化式臭氧程序

目錄

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