化學沉澱法去除廢水氮磷之條件最佳化研究

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摘 要

本研究評估廢水中優養因子銨及磷成份，以化學法沉澱成為鎂銨磷化合物(鳥糞石struvite)的最佳操作條件。本實驗使用合成廢水，並應用Box-Behnken之反應曲面分析法來檢測操作因子如pH值、溫度、鎂與磷比例(Mg:P)、攪拌強度(rpm計)、有機含有等，對磷去除效率的影響。研究結果顯示，PO4-P 去除效率在56.04至90.04%的範圍。ANOVA分析結果顯示，二階模式可以充分地表示各項因子的除磷反應。Struvite沉澱動力學方面，攪拌強度最具影響力，而高效磷去除在50到100 rpm範圍內就可達成；當攪拌速度是50， 80， 100 RPM時，一階速率常數分別為0.813; 3.633和3.928 L.mMol-P-1.min-1。Struvite沉澱動力學實驗也看出有機物含量對PO4-P去除無顯著之影響，但是對反應速率卻有所改變：當糖含量為0.6; 1.02和1.05 g/L時，速率常數分別是1.23, 3.02和1.49 L.mMol-P-1.min-1。在PO4-P 去除90.04% 之下, 銨去除率為 10.2%，struvite沉澱對於銨處理應另作加強。

關鍵詞 : Struvite、RSM、Box-Behnken design、ANOVA、first-order kinetic model.

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