磁性幾丁聚醣/四氧化三鐵奈米複合顆粒之製備及特性研究

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摘 要

本研究分為兩部份主題進行論述，第一部份係以噴霧乾燥法製備磁性幾丁聚醣/四氧化三鐵奈米複合顆粒。產物經場發射電子顯微鏡 (FESEM) 觀察得知奈米複合顆粒呈球狀且表面粗糙，其平均粒徑介於 200~400 nm。超導量子干涉儀 (SQUID) 檢測可看出各樣本具有超順磁的特性、且無矯頑力 (zero coercivity) 及無殘磁 (zero remanence) 的存在，其飽和磁性最高為 27.91 emu/g 。動態光散射分析儀 (DLS) 分析顯示各粒子表面電荷均超過40 mV，所有的樣本可安定分散在水中。論文第二部分係為磁性幾丁聚醣/四氧化三鐵微奈米粉末之製備及分離。本研究利用二流體噴嘴，以噴霧乾燥方式製備磁性幾丁聚醣顆/四氧化三鐵微奈米粉末，透過旋風收集器、多段式串聯電磁鐵收集器及靜電集塵器(ESP)來分離收集磁性粉末。藉由不同電磁鐵的線圈匝數(500圈、1,000圈、1,500 圈)來改變磁場強度(200 G、250 G、300 G)，將不同尺寸之磁性微奈米粉末予以收集。產物經掃描電子顯微鏡（SEM）進行觀察，在旋風收集器收集之粉末粒徑介於1,200 nm~5,000 nm。電磁鐵收集器之粉末粒徑介於 300 nm~2,200 nm，而隨著磁場強度增強粉末粒徑有較小之趨勢。ESP收集器收集之粉末其粒徑介於 200 nm~600 nm，為三種收集器中最小之粒徑。

關鍵詞 : 幾丁聚醣、噴霧乾燥、氧化鐵

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