

Magnetic Fe-Ni bimetallic oxide shell nanorods containing anti-protein polymer segments for protein purification

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Abstract

In this paper, BSA surface-imprinted magnetic Fe-Ni bimetallic oxide shell nanorods (m-FeNi@MIPs@PCBMA) were prepared with the assistance of poly(3-[[2-(methacryloyloxy)ethyl]dimethylammonium] propionate (PCBMA) in connection with the surface-imprinting technique. The Fe-Ni bimetallic oxide shell layer nanorods (m-FeNi) with magnetic responsiveness simplified the separation and recovery process of adsorbed materials. The controlled introduction of PCBMA facilitated the reduction of protein non-specific adsorption. At the optimal encapsulation ratio of 1:0.75 (Wm-FeNi@MIPs: WCBMA), m-FeNi@MIPs@PCBMA could adsorb 122.98 ± 5 mg/g of BSA within 80 min, and the value of the imprinting factor (IF) was also increased from 1.68 (m-FeNi@MIPs) to 3.95. In the mixed protein adsorption and real sample separation experiments, m-FeNi@MIPs@PCBMA could selectively separate BSA. Meanwhile, after seven adsorption-desorption experiments, the loss of BSA adsorption by the imprinted nanorods was only 15.9%, which had good reusability. Therefore, m-FeNi@MIPs@PCBMA has a broader application prospect in the field of protein separation and purification.

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