

Binding characteristics of molecularly imprinted polymers grafted on iniferter-modified carbon nanotube

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Binding characteristics of MIPs grafted on the surface of carbon nanotube (CNT) was investigated. UV light-initiated copolymerization of ethylene glycol dimethacrylate (crosslinking agent) and methacrylic acid (functional monomer) resulted in grafting of MIP on CNT for theophylline as a model template. The resulted polymer including the template molecule was washed with acetic acid solution to extract the template from the polymer. The theophylline-imprinted polymer on CNT showed higher binding capacity for theophylline than non-imprinted polymer. The data of theophylline binding into the theophylline-imprinted polymer correlated well with the Scatchard plot. The binding capacity of the MIP was 3.75 $\mu\text{mol/g}$ MIP-CNT for theophylline at 20 μg theophyllin/ml DMF solution. The equilibrium binding constant of the MIP for theophylline was $5.1 \times 10^3 \text{ M}^{-1}$, which was estimated from the negative slope in the Scatchard plot. These MIPs on CNT can potentially be applied to probe material in biosensor system based on CNT field effect transistor.

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