

Grafting of molecularly imprinted polymers on iniferter-modified carbon nanotube

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Molecularly imprinted polymers (MIPs) can be used as various artificial materials involved in molecular recognition due to their high affinity and selectivity. This study aims to immobilize MIP on the surface of carbon nanotube (CNT) in an effort to develop biosensor system based on CNT field effect transistor using MIP as a probe material. Tween 20 was first immobilized on CNT by hydrophobic interactions. Prior to iniferter coupling, the CNT was premodified by silanisation with 3-chloropropyl trimethoxysilane. The iniferter groups were then introduced reacting the CNT-bound chloromethyl groups with sodium N,N-diethyldithiocarbamate. 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. MIPs on CNT were characterised using elemental analysis, FT-IR spectroscopy, and scanning electron micrography. The theophylline-imprinted polymer on CNT showed higher binding capacity for theophylline than non-imprinted polymer.