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In situ immobilization of a general resolving agent on the magnetic multi wall carbon nanotube for the direct enantioenrichment of DL-mandelic acid

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L-threonine (L-thr) as a general chiral selector anchored on the surface of magnetic multi wall carbon nanotube (MMWCNT) was prepared using an in situ electrostatic adsorption and studied as a new magnetically chiral selector for the separation of chiral DL-mandelic acid (DL-MA) as a model sample. By varying the pH, DL-MA was adsorbed on the surface of magnetic chiral selector through hydrogen bonds. It is recognized that MMWCNT with chiral ligands on its surface simultaneously possess both magnetic property and direct chiral recognition ability. The successful immobilization of L-thr onto the surface of MMWCNT was confirmed by infrared spectra (FT-IR), X-ray diffraction patterns (XRD) and transmission electon microscopy (TEM). The FT-IR and mass spectra of supernatant and elution solutions also confirmed the immobilization of L-thr onto the surface of MMWCNT. The analysis results of specific rotation, HPLC and ultraviolet–visible spectroscopy reveal that the L-thr-MMWCNT show stronger complexation of (+)-enantiomer than (-)-enantiomer. The functional magnetic nanotubes were easily separated from the racemic solution using an external magnetic field which demonstrated its feasibility of recycling the adsorbent. All processes including in situ immobilization, enantioseparation (enantioenrichment) and magnetic separation were done by single process in a short time (only 10 min).

Biography:

Ghazale Daneshvar Tarigh received her PhD degree in analytical chemistry from University of Tehran, Iran in 2015. She received her bachelor's degree (B.Sc.) in pure chemistry at the University of Zanjan, in 2003. She got her master's degree (M.Sc.) under the direction of Prof. YadollahYamini at TMU and Prof. Ali Jabbari at KNTU in 2009. Her field of interest is the development of new extraction technologies, with an emphasis on miniaturizedsample preparation methods and separation techniques.