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Selective recognition and separation of luteolin based on the molecular imprinted hollow SnO_2 and boronate affinity

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Abstract: Molecular imprinted hollow SnO_2 microspheres (Ho-SnO_2@MIPs) integrated with boronate affinity ability were fabricated via atom transfer radical polymerization, and then they were adopted as ideal adsorbents for *cis*-diol containing luteolin (LTL) recognition and separation. Ho-SnO_2@MIPs possessed uniform size (200 nm), porous and hollow structure, appropriate BET surface area (118.6 $m^2 g^{-1}$), and high-density boronate affinity sites (0.22 mg m^{-2}), endowing them highly specific uptake and fast separation properties. Due to the merit of pH responsive boronate affinity, the reversible interaction of boronic acid groups and LTL was regulated by the pH value facilely, which was benefit for the controlled recognition and release. In the batch mode experiments, the quick binding equilibrium (within 60 min) and a rather high specific binding capacity (46.81 mg g^{-1}) at 298 K were observed, and Ho-SnO_2@MIPs also displayed high rebinding selectivity to LTL. By a purification process, a commercially available LTL with 85% purity could be easily extracted and concentrated to 95.28% purity by Ho-SnO_2@MIPs, and the purified products possessed the similar antibacterial performance with standard substance.

Keywords: Molecular imprinting, Hollow structure, Selective separation, Boronate affinity, Luteolin

1. INTRODUCTION

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