

Accepted Manuscript

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PII: S1385-8947(18)31942-9
DOI: <https://doi.org/10.1016/j.cej.2018.10.001>
Reference: CEJ 20062

To appear in: *Chemical Engineering Journal*

Received Date: 16 July 2018
Revised Date: 4 September 2018
Accepted Date: 1 October 2018

Please cite this article as: H. Zeng, L. Wang, D. Zhang, P. Yan, J. Nie, V.K. Sharma, C. Wang, Highly efficient and selective removal of mercury ions using hyperbranched polyethylenimine functionalized carboxymethyl chitosan composite adsorbent, *Chemical Engineering Journal* (2018), doi: <https://doi.org/10.1016/j.cej.2018.10.001>

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Highly efficient and selective removal of mercury ions using hyperbranched polyethylenimine functionalized carboxymethyl chitosan composite adsorbent

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ABSTRACT

A cost-effective adsorbent for highly efficient removal of mercuric Hg(II) ions from aqueous media remains a great challenge. Herein, a novel polymer-based adsorbent of hyperbranched polyethylenimine functionalized carboxymethyl chitosan semi-interpenetrating network composite (HPFC) was fabricated through a facile one-step crosslinking reaction. Notably, the as-prepared adsorbent demonstrated ultra-high adsorption capacity toward the removal of Hg(II) ions. Upon treatment with 20 mg-dosage of HPFC in an aqueous medium (20 mL), the concentration of Hg(II) is decreased from 798.1 mg/L to 0.02 mg/L, which is below the national drainage standard of 0.05 mg/L for industrial wastewater in China. A kinetic study shows that the adsorption of Hg(II) ions follows the pseudo-second-order model, indicating

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