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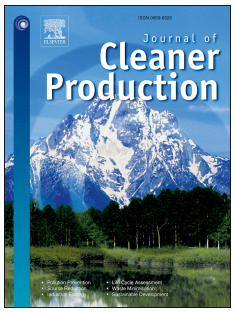

Efficient removal of organic dyes from aqueous solution by rapid adsorption onto polypyrrole–based composites

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Efficient removal of organic dyes from aqueous solution by rapid adsorption onto polypyrrole–based composites

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Abstract

In order to improve the adsorption capacity of polypyrrole, two inexpensive and renewable biological resources containing abundant functional groups were used to achieve novel polypyrrole-based composites. Three low-cost polypyrrole-based composites, polypyrrole-chitosan-lignosulfonate (PPY-CS-LS), polypyrrole-chitosan (PPY-CS) and polypyrrole-lignosulfonate (PPY-LS) were prepared via an in-situ polymerization of pyrrole monomers with chitosan (CS) and/or lignosulfonate (LS) as dispersants. PPY-CS-LS, PPY-CS and PPY-LS nanoparticles with average diameters of 50 nm, 73 nm and 213 nm, respectively, were obtained with pyrrole/oxidant molar ratio of 1:1, and the feed contents of CS and/or LS of 10 wt.%. Selective adsorption properties of the three composites for six dyes were investigated. Results showed that PPY-CS-LS and PPY-CS composites possessed much higher selectivity for acid (anion) dyes, especially for Congo red (CR); the removal efficiencies of PPY-CS-LS and PPY-CS composites for CR were up to 99.3% and

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