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Sequestration of Methyl Orange Dye from Aqueous Solution by Polyaniline, Polypyrrole and Polythiophene: A Comparative Study

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Abstract—*In-situ Oxidative polymerization methods are used to synthesize the protonated polyaniline (PANI-ES), protonated polypyrrole (PPY) and polythiophene (PTP). Methyl orange (MO) being an azo dye is removed by PANI and PPY to a large extent but a little effect is observed with PTP as no protonation is possible in case of PTP. The maximum adsorption capacity of PANI and PPY are 408 mg g^{-1} and 390 mg g^{-1}, respectively towards the sequestration of MO dyes from aqueous solution. Both PANI and PPY show Langmuir type of adsorption with MO and follows pseudo-first order kinetics. Adsorption of MO dye molecules on PANI and PPY are endothermic in nature. On the basis of aforementioned findings, these polymers can be used as potential adsorbents towards the removal of negatively charged dyes from industrial samples.*