Preparations of magnetized porous carbon by using ferrite particles
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Abstract: Magnetic porous carbon (MPC) with ferrite (Fe₃O₄) particles is facilely prepared by pyrolysis of starch coated ferrite. Concentration of starch solution had been optimized for particle size and magnetization property. The resultant MPC is characterized and utilized as an adsorbent for methylene blue removal from aqueous solutions. The effects of pyrolysis temperature and pyrolysis time on the structures and properties of the MPC were analysed. Results show that the development of the porous structures can be facilitated by increasing temperature or time but the comparison studies indicated temperature is the key role in the formation of ferrite. Pyrolysis temperature above 750 °C for 1 h, yield product which do not posses magnetic property probably due to Fe₃O₄ was converted into Fe₃C. The prepared MPC from pyrolysis temperature of 600-700 °C for 1-2 h demonstrated the high surface area, 229-267 m² g⁻¹, with a micropores, mesopores and macropores combination. The adsorption kinetics data could be well described by the pseudo-second-order model, and the methylene blue adsorption onto MPC is an endothermic and spontaneous process. After adsorption, MPC could be effectively separated by applying a magnetic field.

Keywords: Carbon materials; Magnetic activated carbon; Porous materials