Preparation of ordered mesoporous carbons with ammonia modification for Orange II adsorption

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ABSTRACT

In this study, the ordered mesoporous carbon (CMK-3) was prepared using SBA-15 as hard-template and furfuryl alcohol as the carbon source and then ammonia modification via tube furnace under different temperatures. The effect of ammonia activation temperature and the sorption behavior of Orange II (O II) on ordered mesoporous carbons were investigated. The textural property and surface chemistry of the ordered mesoporous carbons also were investigated by N2 adsorption, elemental analysis, and X-ray Photoelectron Spectroscopy. Results indicated that the formation of mesopores volume, specific surface area, total pore volume, and the average pore diameter could be enhanced with ammonia modification for the mesoporous carbon. Furthermore, the nitrogen content of as-prepared samples increased with increasing modification temperature. In addition, the results indicated that the mesoporous carbon CMK-3-1173 treated at 900˚C has developed specific surface area and abundant mesopores, which showed the largest adsorption capacity for O II among all samples investigated.

Keywords: CMK-3; Ammonia modification; Nitrogen functional group; Adsorption