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Isoelectric point and adsorption activity of porous g-C3N4

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Abstract

The isoelectric point (IEP) is an important physicochemical parameter of many compounds, such as oxides, hydroxides, and nitrides, and can contribute to estimation of the surface charges of compound particles at various pH conditions. In this work, three types of graphitic carbon nitrides (g-C3N4) were synthesized by directly heating melamine, thiourea, and urea. The prepared samples showed different microstructures and IEPs that influenced their adsorption activity. Differences in microstructure resulted from the various precursors used during synthesis. The IEPs of the obtained g-C3N4 were measured to be approximately 4-5, which is due to the equilibrium of chemical reactions between hydrogen ions, hydroxyl ions, and amine groups on the g-C3N4 surface. The IEP of g-C3N4 prepared from thiourea was lower than those of the corresponding samples prepared from melamine and urea. The adsorption activity of methylene blue on g-C3N4 prepared from urea and thiourea was excellent, which indicates that g-C3N4 is a promising adsorbent. This work provides a useful reference for choosing precursors with which to prepare g-C3N4 and combining g-C3N4 with other compounds in solution. (C) 2015 Elsevier B.V. All rights reserved.

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