

N-doped Carbon Structure via Hydrothermal Carbonization using Microwave Irradiation

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Nitrogen-containing carbonaceous materials have been much attracted because of their enhancement of electron-transfer properties and chemical reactivity. We synthesized N-doped carbon structure using a hydrothermal carbonization process. The hydrothermal carbonization of glucose in urea solution was carried out at 210 °C for 15 min using microwave-assisted heating, resulting in spherical structures. The nitrogen concentration of the spheres was controlled by varying the concentration of urea solution. Elemental analyses revealed that these spheres contain 40 % -45 % of carbon by atomic ratio and 0 % - 10 % of nitrogen by atomic ratio. When the water was completely removed, and the spheres were further irradiated by microwave (1500 W) for 5 min, the carbon atomic ratio of the spheres increased to 80 % - 85 % and the nitrogen atomic ratio increased to 0 % - 15 %, whereas oxygen atomic ratio decreased to 0 % - 3 %.