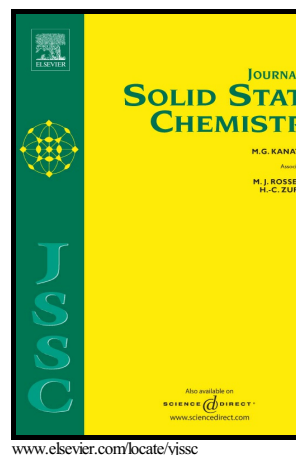


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Carbon-based strong solid acid for cornstarch hydrolysis

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Abstract

Highly sulfonated carbonaceous spheres with diameter of 100-500 nm can be generated by hydrothermal carbonization of glucose in the presence of hydroxyethylsulfonic acid and acrylic acid at 180 °C for 4 h. The acidity of the prepared carbonaceous sphere C4-SO₃H can reach 2.10 mmol/g. It was used as a solid acid catalyst for the hydrolysis of cornstarch. Total reducing sugar (TRS) concentration of 19.91 mg/mL could be obtained by hydrolyzing 20 mg/mL cornstarch at 150 °C for 6 h using C4-SO₃H as solid acid catalyst. The solid acid catalyst demonstrated good stability that only 9% decrease in TRS concentration was observed after 5 repeat uses. The as-prepared carbon-based solid acid catalyst can be an environmentally benign replacement for homogeneous catalyst.

Keywords: hydrothermal carbonization, solid acid catalyst, acidity, hydrolysis, total reducing sugar, corn starch.

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