A double sulfonated mesoporous polydivinylbenzene as a catalyst for the condensation of phenol and cyclohexanone

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Abstract

As an excellent substitute for Bisphenol-A, Bisphenol-Z is obtained by the condensation of phenol and cyclohexanone under acid catalysis. In this paper, sulfonated mesoporous polydivinylbenzene was prepared by different sulfonation methods and then as a solid acid to catalyze the condensation of phenol and cyclohexanone. The physicochemical properties of the solid acid were characterized by FT-IR, BET, SEM and acid base titration, then the structure-activity relationship of the solid acid was studied. The acid base titration results showed that the acid density of mesoporous polydivinylbenzene solid acid prepared by double sulfonation (D-SPDVB) was the highest, reaching 4.62 mmol H+/g. The catalytic results showed that D-SPDVB had better catalytic performance than sulfuric acid, Amberlyst-15 and other traditional Bronsted acids due to its high acid density and suitable pore structure. More importantly, D-SPDVB had good stability, and its catalytic performance did not decrease significantly after reused 5 times.

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