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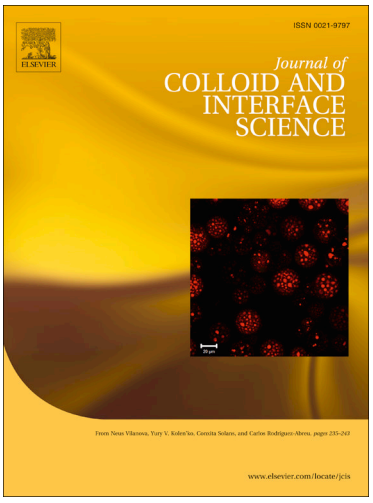

Functionalized Carbon Dot Adorned Coconut Shell Char Derived Green Catalysts for the Rapid Synthesis of Amidoalkyl Naphthols

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Functionalized Carbon Dot Adorned Coconut Shell Char Derived Green Catalysts for the Rapid Synthesis of Amidoalkyl Naphthols

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Abstract

A one pot synthesis of carbon dot incorporated porous coconut shell char derived sulphonated catalyst is reported here for the first time and is effectively used in the multicomponent synthesis of amidoalkyl naphthol. Macroporous nature of the char is revealed from scannig electron microscopic (SEM) analysis, whereas the dispersion of the carbon dots (CDs) on the porous coconut shell char is confirmed from the high resolution transmission electron microscopic (HRTEM) analysis. Fluorescence emission spectrum further confirmed the presence of CDs in the catalyst. Fourier-transform infrared (FTIR) spectral analysis of the materials indicated that sulphonation occurred both to the carbon dot and to the porous char. X-ray photo electron spectroscopic (XPS) analysis of the active catalyst confirmed the presence of both sulphonic acid and carboxylic acid groups in the catalyst. The coconut shell char derived materials prepared by varying the amount of H_2SO_4 are successfully utilized as efficient alternative green catalysts for the multicomponent reaction, where excellent activity in amidoalkyl naphthol synthesis is obtained within short periods under solvent free reaction conditions. A maximum yield of 98% is obtained in the synthesis of N-[Phenyl-(2-hydroxy-naphthalen-1-yl)-methyl]-benzamide, the representative amidoalkyl naphthols, with one of the present catalyst within 3 min of reaction. The catalyst is highly active for the reactions carried out with varieties of aldehydes and amides with a product yield in the range of 88-98%. The best catalyst system retained more than 90% of its initial activity even after 6 repeated runs.