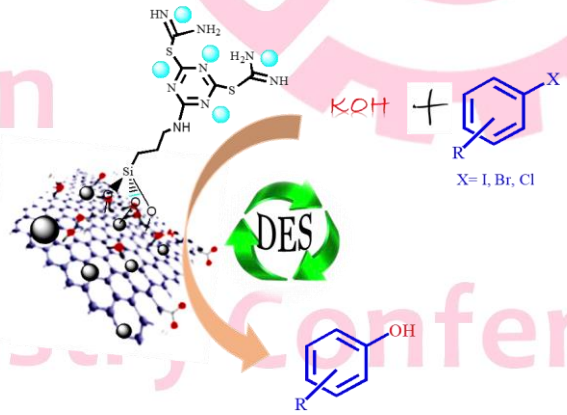
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Cu immobilized on Fe_3O_4@Biochar nanoparticles: a novel, inexpensive and highly efficient heterogeneous magnetic nanocatalyst for C-O coupling reactions in green media

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Carbon-heteroatom cross-coupling reactions based on transition metal catalyst systems have Transition metals include Pd, Cu, Co, Fe, Ag, Au, and Ni allow chemists to catalyze cross-coupling reactions, however, using affordable and friendly environment designed catalytic systems have more attentions among scientists, lastly [1, 2]. Biochar as the only carbon neutral alternative, has the unique chemical structure containing tailored surface functional groups and large surface area. The selection of biochar as a surface will be ideal for the preparation of heterogeneous catalysis [3]. magnetic modification can be more suitable technique to separate them by applying a magnet, make long centrifugation and filtration steps unnecessary [4]. Herein we report the synthesis of a magnetically separable core-shell-like Fe_3O_4@Biochar-Cu (MBC@BTT-Cu(II)) as an environmentally friendly heterogeneous catalyst. The as-prepared nanocatalyst was well characterized by various techniques such as FT-IR, XRD, BET, FE-SEM, EDX, TGA, VSM, ICP-OES and elemental analysis and evaluated for the C-O coupling reactions in DES as green solvent. Also, the separation of the nanocatalyst was easily performed by an external magnet and applied again for eight fresh runs with no considerable loss of catalytic activity. ***Keywords:*** Heterogeneous Catalysis, Magnetic Biochar Nanoparticles, C-O Coupling Reactions.



Scheme 1. C-O Coupling reactions catalyzed by MBC@BTT-Cu(II)

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