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Heterogenous graphene supported cobalt metal catalyzed dehydrogenation of N-heterocyles

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The promoterless AD (acceptorless dehydrogenation) reaction with the release of H_2 provides promising synthetic routes for several organic transformation such as alcohol dehydrogenation to carbonyl compounds as aldehydes, ketones, esters, amides, amine to imine and N-heterocycles dehydrogenation which is synthetically very important. Dehydrogenation of N-heterocyles were mediated by cobalt heterogenous has been done at atmospheric condition with the liberation of hydrogen which is most atom efficient way to produce quinoline. Owing to the increasing demand for environmentally benign synthetic processes, promoterless AAD reactions are desirable. Conventionally, oxidative dehydrogenation reaction has been performed using stoichiometric or excess amounts of oxidants such as DDQ, peroxides, iodates, chromium(IV) reagents and metal oxides, that produce large excess of hazardous waste equivalent to the oxidants which is undesirable environmentally and economically. An alternative to these strong and toxic oxidants is to use pressurized oxygen air or oxygen which can cause explosion hazards. Removal of dihydrogen atoms from adjacent atomic centers of organic molecule is highly thermodynamically uphill process. Thus, it would be challenging to explore the catalytic performance of hetrogenous catalysts for the dehydrogenation of nitrogen heterocycles. Our interest is in the development of efficient heterogeneous catalyst containing sustainable transition metals, such cobalt for the dehydrogenation reaction. we have propse first cobalt based heterogenous catalytic system for challanging catalytic dehydrogenation reactions of nitrogen heterocycles. In this reaction only hydrogen is side product which is good in the context of 'hydrogen economy' and is an effective alternative to the classical oxidation reactions.

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