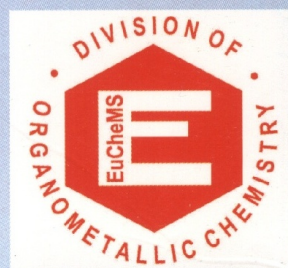
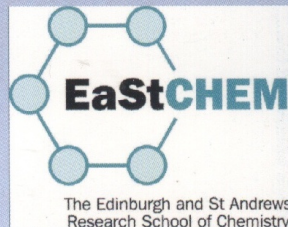


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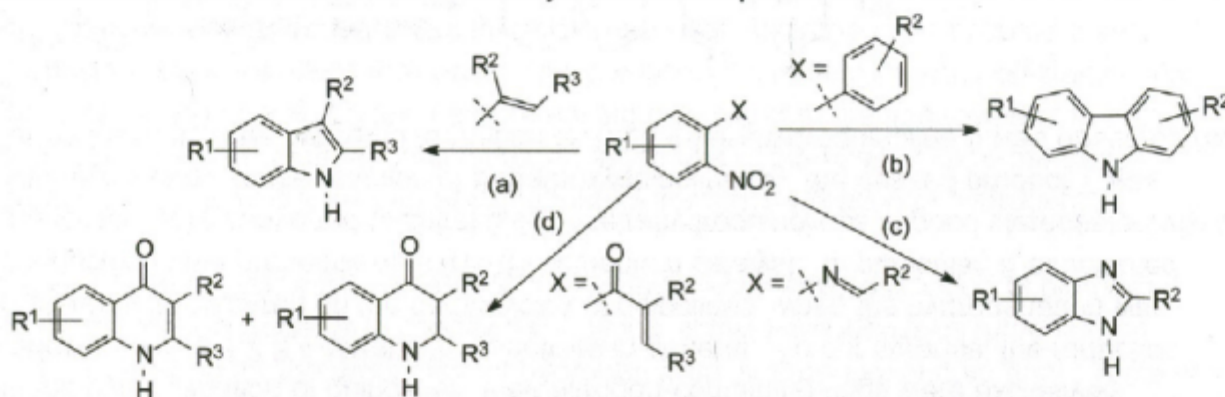
Alkyl Formates as CO Alternatives in Nitroarene Deoxygenation to give Indoles

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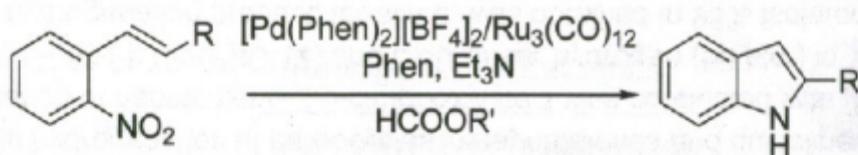
Reduction of functionalized nitroarenes by carbon monoxide can generate a number of heterocyclic systems, only a few of which are shown below.¹ Inter-molecular reactions between nitroarenes and alkenes or alkynes are also possible.²⁻⁵



Although these reactions are very selective in some cases, they have been only employed by a few research groups, clearly because of the requirement for an autoclave and a high pressure CO line. We thus decided to employ formate esters as CO sources.

Decomposition of formates can be effected under strongly basic conditions, but these are not compatible with the present syntheses. However, Ru₃(CO)₁₂ is able to catalyze formate esters decomposition to CO and alcohols and its presence is compatible with the palladium/phenanthroline catalytic system employed for the nitroarene reduction reactions.

Here we report our preliminary results on the use of the [Pd(Phen)₂][BF₄]₂/Ru₃(CO)₁₂/Phen catalytic system for the synthesis of indoles from *ortho*-nitrostyrenes using formate esters as the reductant. Each metal alone is ineffective. The reactions were performed in an economical glass pressure tube without the need for autoclaves or a CO line.



This discovery paves the way to developing the same type of system even for other reactions of the same class.

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