**Catalysis by bimetallic nano particles**

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 **Introduction:**

 The interest and use of nano particles have seen an exponential growth in the past few years. In particular, transition metal based nano particles have become an important class of catalysts owing to their ability to catalyze a wide spectrum of reactions [1-2].

 Thoughsingle metal catalysts usually exhibit high activity and selectivity, their applications remain limited in scope due to cost, catalyst poisoning, deactivation and limited scope of recyclability [3]. Bimetallic nano catalysts have gained considerable interest because they exhibit distinctly different and often better activity as compared to pure monometallic systems as determined via experimental studies [4].

**Suzuki reaction Using nano Cu**

It is cross coupling reaction between aryl halide with boronic acid. It is important in the organic synthesis. Suzuki cross coupling reaction generally carried out using Palladium, Nickel and Iron. Scientist Rothenberg et al carried out Suzuki coupling reaction using nano Cu particles. When Suzuki coupling reaction is carried out using Cu nanoparticles show significant activity and reaction is completed within 8 hr at 110° C.[5]



**Stille coupling using nano Cu**

 Stille reaction is cross coupling between aryl halide with organotin compounds. In nano Cu2O using ionic liquid TBAB in the presence of Phosphorus ligand. A reaction takes place at 125-130°C [6]

 

**Heck reaction using nano copper**

 When copper bronze alloy treatment with iodo benzene a Cu (4nm) nano partical are formed. This plays active role in the reaction. In Heck reaction activated alkene is treated with aryl halides using nano Copper & base at 130°C. Reaction is completed in 16 hrs. Activity of catalyst increases after recycle it was maximum use in six cycles.[7]

 

**Arylation of aromatic heterocycles**

 Nitrogen containing heterocycles (Triazole, indole & imidazoles) are arylated using aryl & hetero halides. The reaction should be carried out using nano Cu2O, n- butylammonium fluoride (TBAF) & 1, 10 phenanthroline at 140°C. [8]

 

**Sonogashira cross-coupling**

It is cross coupling reaction between terminal alkynes with aryl halides in presences of palladium catalyst & base. Now days a copper cluster used in the reaction this cluster is can be recycled upto 3 times without losing its activity while leaching data of catalyst is not available. In this reaction mechanism proposed by oxidative addition & reductive elimination.[9]

 

**Summary and outlook**

 This write up gives information on recent developments in the bond formation reaction using Cu/Transition bimetallic nano particles as catalyst. Now a days using nano Cuo catalyst Suzuki, Stille, Heck, Sonogashira coupling reactions are carried out. As compared with other metal Cu is less expensive& environmentally acceptability.

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