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Reaction of 1,2-Difunctionalized Ethanes with Aryl Iodides in Copper-catalyzed Cross-Coupling: Application to Synthesis of Phenols

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Abstract

A series of 1,2-difunctionalized ethanes, such as ethylene glycol, aminoethanol, 1,2-diaminoethane, dimethylaminoethanol, N,N'-dimethylethane-1,2-diamine, were investigated to test the reactivity with aryl iodides in the presence of copper catalysts. Under the reaction conditions, they produce the various heteroatom cross-coupled products. Interestingly, ethylene glycol and dimethylaminoethanol afforded mainly the phenolic compounds while the others produced different cross-coupled products. Although ethylene glycol and dimethylaminoethanol resulted in the same product, their behaviors in the reaction were quite different: ethylene glycol appears to mostly act as the ligand and

2-(dimethylamino)ethanol appears to serve as both the ligand and reactant. This finding led to a copper-catalyzed synthesis of phenols using either ethylene glycol or 2-(dimethylamino)ethanol, which can be applied to a variety of aryl iodides, providing an alternative synthetic route to phenols

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```