CuI-USY as a Ligand-Free and Recyclable Catalytic System for the Ullmann-Type Diaryl Ether Synthesis


Significance: Copper(I)-exchanged zeolite USY (CuI-USY) catalyzed the Ullmann-type coupling of phenols with aryl iodides or bromides in the presence of cesium carbonate to give the corresponding diaryl ethers in up to 86% yield. In the reaction of 3,5-dimethylphenol with iodobenzene, the catalyst was recovered by simple filtration and reused four times without loss of catalytic activity.

Comment: The authors have previously reported a Huisgen cycloaddition and a Glaser coupling with CuI-USY (Org. Lett. 2007, 9, 883; Eur. J. Org. Chem. 2009, 423). The catalytic activity of CuI-USY for the Ullmann-type coupling was superior to that of the other Cu(I) zeolites, such as CuI-MOR, CuI-β, or CuI-ZSM5. CuI-USY was ineffective for the reactions of 4-cyano- or 4-nitrophenols with phenyl halides. ICP-AES analysis revealed that no copper leached from the catalyst during the reaction.