

Área: ORG

Application of Electrosynthesized Copper(I) Phenylacetylide as a Catalyst for the Solvent-Free Synthesis of Propargylamines and 1,2,3-Triazoles

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Palavras Chave: Organic Synthesis; Catalysis; Electrosynthesis; Propargylamines; 1,2,3-Triazoles; Solvent-free.

Highlights

Novel application of a cheap, easily obtainable, stable and reusable catalyst;

Good to excellent yields in sustainable synthesis methodology.

Resumo/Abstract

Propargylamines (PPGAs) and 1,2,3-triazoles (TZs) are intermediates for the synthesis of compounds with diverse applications, including bioactive substances with potential use in treating Parkinson's, Alzheimer's, HIV, and cancer^{1,2}. Typically, the synthesis of PPGAs and TZs requires solvents, high temperatures, and transition-metal nanoparticles or salts as catalysts, especially copper(I), to produce the respective metal acetylides, which are intermediates in the reaction mechanism. However, both copper(I) salts and copper-based nanoparticle catalysts tend to oxidize under ambient conditions, leading to catalytic loss over time³. It is known that the electrosynthesis of copper(I) acetylides can be achieved through the anodic dissolution of metallic copper in a solution containing the respective alkyne. It is also known that these acetylides are highly stable, allowing long-term storage⁴. In this work, a sustainable methodology was developed by employing the electrosynthesized copper(I) phenylacetylide as a catalyst in the solvent-free synthesis of PPGAs and TZs. The variation of the starting reagents afforded good to excellent yields, as shown in Figure 1A and 1B. Additionally, the catalyst could be recovered and reused for three reaction cycles without significant loss of activity. This simple, solvent-free, and atom-economical approach aligns with green chemistry principles and highlights the potential of this catalyst for applications in other organic synthesis reactions.

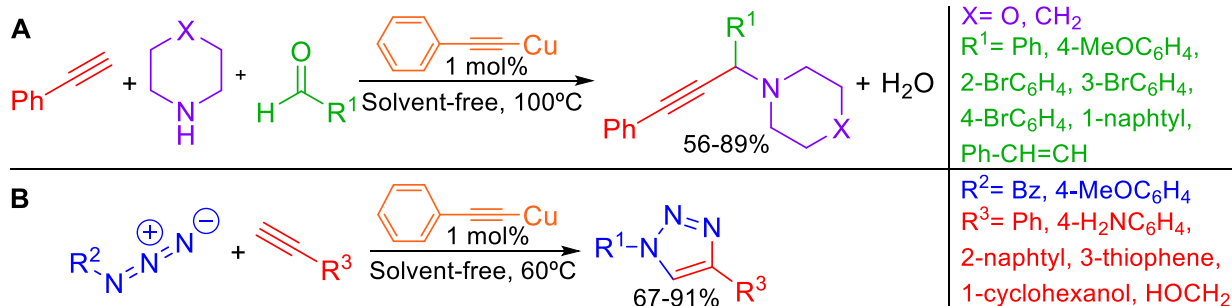


Figure 1. (A) Reactional scheme for propargylamine synthesis. (B) Reactional scheme for 1,2,3-triazole synthesis.

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