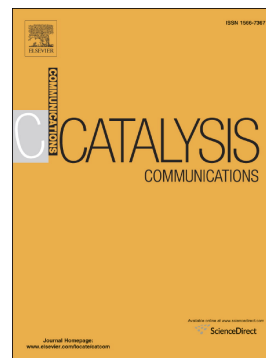


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# Carbon coated copper nanostructures as a green and ligand free nanocatalyst for Suzuki cross-coupling reaction

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## Abstract

In this work, carbon coated copper nanoparticles and nanowires were synthesized as a ligand free nanocatalyst that naturally contains ppm levels of Pd with no post-modification via a two-steps reduction-hydrothermal process. Transmittance electron microscope (TEM), Scanning electron microscope (SEM), X-ray diffraction, inductively coupled plasma optical emission spectrometry (ICP-OES), and Raman spectroscopy were employed for the characterization of the nano-catalyst. The utilization of the synthesized Cu-C nano-catalyst in Suzuki cross coupling reaction showed a high performance in the synthesis of various biaryls in water. Moreover, this catalyst reused successfully with no significant yield decrease even after four subsequently runs.

**Keywords:** Copper nanoparticles; Copper nanowires; Suzuki reaction; Carbon Coated Copper nanostructures.

## 1. Introduction

The Suzuki-Miyaura cross-coupling reaction of Arylboronic acid with Aryl halides ( $C_{sp^2-X}$ ) has become a popular tool for selective construction of carbon-carbon bonds and mainstay of modern synthetic organic chemistry for the preparation of biaryl compounds [1, 2]. These compounds are important structural substructures in numerous natural products, polymers, agrochemicals, pharmaceutical intermediates [3-5], and other materials [6-8]. During the past decades, numerous efforts have been made to develop efficient and selective catalytic systems for the Suzuki-

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