

Magnetic nanoparticles functionalized with copper hydroxyproline complexes as an efficient, recoverable, and recyclable nanocatalyst: synthesis and its catalytic application in a tandem Knoevenagel–Michael cyclocondensation reaction.

Autorzy

Fatemeh Kalantari
Ali Ramazani
Mohammad Reza Poor
Heravi
Hamideh Aghahosseini
Katarzyna Ślepokura

Rok wydania

2021

Czasopismo

Inorganic Chemistry

Numer woluminu

60

Strony

15010-15023

DOI

10.1021/acs.inorgchem.1c02470

Kolekcja

Naukowa

Język

Angielski

Typ publikacji

Artykuł

Streszczenie

A novel catalyst has been afforded by attaching of a $\text{Cu}(\text{proline})_2$ complex to magnetic nanoparticles through cheap, simple, and readily available chemicals. This catalyst was characterized by Fourier transform infrared, energy-dispersive X-ray, X-ray diffraction, vibrating-sample magnetometry, transmission electron microscopy, scanning electron microscopy, and inductively coupled plasma analyses. The catalytic activity of the $\text{Fe}_3\text{O}_4@\text{NH}_2@\text{TCT@HProCu}$ nanocatalyst was investigated in a green and effective synthesis of pyran derivatives in high yields by applying three-component reactions of malononitrile, dimedone, and aldehydes in ethanol. Conversion was high under optimal conditions. The obtained nanocatalyst could be easily separated from the mixture of the reaction and was recyclable nine times via a simple magnet without considerable reduction of its catalytic efficiency. Operational simplicity, high product yields, environmental friendliness, ecofriendliness, economical processing, and easy workup are the features of this methodology.

Słowa kluczowe

Reaction products, Nanoparticles, Ethanol, Catalysts, Nanocatalysts

Adres publiczny

<http://dx.doi.org/10.1021/acs.inorgchem.1c02470>

Strona internetowa wydawcy

<https://www.acs.org/content/acs/en.html>