

Proline-Cu complex based 1,3,5-triazine coated on Fe₃O₄ magnetic nanoparticles: a nanocatalyst for the Knoevenagel condensation of aldehyde with malononitrile.

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Streszczenie

In the present work, based on a convergent protocol, we synthesized proline-Cu complex based 1,3,5-triazine coated on Fe₃O₄ magnetic nanoparticles as a green and recyclable nanocatalyst by an inexpensive and simple procedure. Then, fully specified by Fourier transform infrared spectroscopy (FT-IR), we pursued field emission scanning electron microscopy (FESEM), vibrating sample magnetometry (VSM), powder X-ray diffraction (PXRD), energy dispersive X-ray analysis (EDX), thermogravimetric analysis (TGA), and Brunauer–Emmet–Teller (BET) and inductively coupled plasma (ICP) analysis. The catalytic movement of the synthesized nanocatalyst underwent successful investigation in the Knoevenagel condensation through malononitrile as well as various aldehydes in H₂O as a green solvent at room temperature. The high efficiency, short reaction time, ecofriendly properties, and easy workup can be considered the major benefits of the current method. Also, the separation of the nanocatalyst was easily performed by an external magnet and applied again for eight fresh runs with no considerable loss of catalytic activity.

Słowa kluczowe

heterogeneous catalysis, Knoevenagel condensation, magnetic nanoparticles, one-pot reaction, L-proline-Cu/TCT@NH₂@Fe₃O₄

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