

# **Erbium anchored iminodiacetic acid (IDA) functionalized CoFe<sub>2</sub>O<sub>4</sub> nano particles: an efficient magnetically isolable nanocomposite for the facile synthesis of 1,8-naphthyridines**

Taiebeh Tamoradi<sup>1</sup>, Mansoureh Daraie<sup>2</sup>, [Majid M. Heravi](#)<sup>\*2</sup>, Bikash Karmakar<sup>3</sup>

1- Department of Chemistry, Payame Noor University, Tehran, Iran

2- Department of Chemistry, School of Science, Alzahra University, Vanak, Tehran, Iran

3- Department of Chemistry, Gobardanga Hindu College, 24-Parganas (North), India

## **Abstract**

A novel functional material was developed by immobilizing an Iminodiacetic acid–erbium (Er) complex onto the surface of magnetic spinel CoFe<sub>2</sub>O<sub>4</sub> nanoparticles. The obtained nanocomposite was fully characterized using different analytical techniques such as FT-IR, XRD, SEM, BET, EDX and X-ray atomic mapping analysis. The catalytic activity of this novel material was investigated in the successful synthesis of 1,8-naphthyridine derivatives via a three component reaction involving 2-aminopyridine, malononitrile and various aryl aldehydes. The reactions ended up with excellent yields in short reaction times. The catalyst was reused seven times in the proposed reaction without appreciable loss of activity.