

Source: Ghanbarian, M., Beheshtiha, S.Y.S., [Heravi, M.M.](#) et al. A Nano-sized Nd–Ag@polyoxometalate Catalyst for Catalyzing the Multicomponent Hantzsch and Biginelli Reactions. *J Clust Sci* (2019). <https://doi.org/10.1007/s10876-019-01739-w>

A Nano-sized Nd–Ag@polyoxometalate Catalyst for Catalyzing the Multicomponent Hantzsch and Biginelli Reactions

Manizheh Ghanbarian¹, Seyeed Yahya Shirazi Beheshtiha¹, [Majid M. Heravi](#)¹, Masoud Mirzaei², Vahideh Zadsirjan¹ & Nahid Lotfian¹

1- Department of Chemistry, School of Science, Alzahra University, POBox 1993891176, Vanak, Tehran, Iran

2- Department of Chemistry, Faculty of Science, Ferdowsi University of Mashhad, 917751436, Mashhad, Iran

Abstract

For the first time the catalytic activity of AgNdSiW11, was examined in two named reactions, namely Hantzsch and Biginelli reactions. A simple, eco-friendly and highly efficient one-pot synthesis of polyhydroquinoline derivatives via Hantzsch multicomponent reactions (MCRs) involving cyclocondensation of differently-substituted aldehydes, β -ketoesters or dimedone, active methylene compounds, and ammonium acetate as a source of nitrogen, in the presence of AgNdSiW11 as a catalyst in EtOH/H₂O under reflux conditions in high yields was successfully achieved. Furthermore, the catalytic performance of AgNdSiW11 was also successfully tested in the synthesis of 3,4-dihydropyrimidin-2-(1H)-ones via Biginelli MCR involving cyclocondensation of differently-substituted aldehydes, ethyl acetoacetate and urea as source of nitrogen in the presence of AgNdSiW11 under reflux

Source: Ghanbarian, M., Beheshtiha, S.Y.S., [Heravi, M.M.](https://doi.org/10.1007/s10876-019-01739-w) et al. A Nano-sized Nd–Ag@polyoxometalate Catalyst for Catalyzing the Multicomponent Hantzsch and Biginelli Reactions. *J Clust Sci* (2019). <https://doi.org/10.1007/s10876-019-01739-w>

conditions in EtOH/H₂O. This prolific combination of Ln and POMs inaugurates a powerful class of catalysts for the different chemical transformations, which overcomes key limitations of previously established salts and Lewis acidic metals-based catalysts under low catalyst loading, the use of water scavengers, dry solvents and additives for facilitating the specialized experimental setups commonly employed to the organic reactions.

Keywords: Mono-lacunary Keggin, Multicomponent reaction, One-pot manner, Polyhydroquinolines, Hantzsch reaction, Dihydropyrimidones, Biginelli reaction