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Chemoselective synthesis of drug-like pyrrolo[2,3,4-kl]acridin-1-one using polyoxometalate@lanthanoid catalyst

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Abstract

The incorporation of polyoxometalates (POMs) or metal oxides into the metal–organic frameworks opens new research avenues for the synthesis of heterogeneous catalysts. In this project, a catalytic system based on neodymium clusters and Keggin-type of heteropoly acid (HPA) (Na[Nd(pydc-OH)(H₂O)₄]₃[SiW₁₂O₄₀]) was used as heterogeneous catalyst for one pot synthesis of pyrroloacridines, via multi component reactions involving dimedone, isatin and aniline in green condition. The novelty of this work originates from using inorganic–organic hybrids based upon POMs in catalyzing organic transformation. Compared with parent HPA (89.0% yield in 15 min for [SiW₁₂O₄₀]₄–), this hybrid catalyst showed higher catalytic activity (94% yield in 8 min) in pyrroloacridines synthesis. The hybrid compound could be reused at least five times without obvious loss of the catalytic activity.

Keywords: Polyoxometalate, Pyrrolo[2,3,4-kl]acridin-1-ones, Inorganic–organic hybrid catalyst, Chemoselective synthesis, Green chemistry