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Heteropolyacid-based ionic liquid [Simp]₃PW₁₂O₄₀ nanoparticles as a productive catalyst for the one-pot synthesis of 2H-indazolo[2,1-b]phthalazine-triones under solvent-free conditions

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Abstract

A novel Keggin-type heteropolyacid-based ionic liquid [Simp]₃PW₁₂O₄₀ was developed via the reaction of the as synthesized ionic liquid 3-sulfonic acid 1-imidazolopyridinium hydrogen sulfate [Simp]HSO₄ with an aqueous solution of H₃PW₁₂O₄₀. Then, the formulated [Simp]₃PW₁₂O₄₀ was changed to the nano-form via solvothermal processing in tetralin at 220 °C. After that, the provided powdered solid nanomaterial was characterized by FT-IR, ¹H-NMR, XRD, SEM, EDX and TGA analyses. Then, the focused nanomaterial was handled as a productive and encouraging nanocatalyst for the establishment of 2H-indazolo[2,1-b]phthalazine-1,6,11(13H)-trione attendants through one-pot, multi-component contraction of aldehydes, phthalhydrazide, and dimedone under solventless status and the generality and practical tolerance of this useful and environmentally benign method are illustrated. The simple work-up, smooth reaction conditions, good to excellent yields, and reasonably short reaction times are the particular benefits of this protocol. Besides, the new nano-powdered ionic liquid was a successful and modest catalyst that could definitely be recycled and reused several times without apparent decrease in its catalytic activity.

Keywords: ionic liquid; heterogeneous; [Simp]₃PW₁₂O₄₀; phthalazine-triones

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