Synthesis of Pyrazolo-[4,3:5,6]pyrido[2,3-d]pyrimidine-diones Catalyzed by a Nano-sized Surface-Grafted Neodymium Complex of the Tungstosilicate via Multicomponent Reaction

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Abstract

An inorganic–organic hybrid based on lanthanide clusters and Keggin type polyoxometalates (POMs) (Na[Nd (pydc-OH)(H₂O)₄]₃][SiW₁₂O₄₀]) was used the first time as trinuclear catalyst for one pot synthesis of pyrazolo[4,3:5,6]pyrido[2,3-d]pyrimidine-diones, via two different four and five-component reactions involving hydrazine hydrate, ethyl acetoacetate, aryl aldehydes, and 6-amino-1,3-dimethyl uracil or barbituric acid with ammonium acetate as alternative materials in green condition. To evaluate potential application of the as-made hybrid in adsorption and separation processes, nitrogen adsorption was performed at 77 K through simulation study. The hybrid catalyst was further characterized via powder X-ray diffraction (PXRD) at room temperature which indicated the good phase purity of the catalyst. The results show that the catalytic activity of the hybrid catalyst has increased relative to each parent component due to the special interaction between Keggin anions and pydc-OH ligands.

Keywords: anticancer agents, Heteropoly acid, inorganic–organic hybrids, Polyoxometalates, Pyrazolo-[4,3:5,6]pyrido[2,3-d]pyrimidine-diones