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Nanoporous Zeolite H-A material: An efficient, reusable and benign catalyst for the synthesis of 3, 4-Dihydropyrimidin-2(1*H*)-ones under solvent free conditions

Rawoof Ahmad Naikoo[1*], Muzzaffar Ahmad Mir[1], Sami Ullah Bhat[1], Radha Tomar[1] and S.S. Tomar[2]

[1]S. O. S in Chemistry, Jiwaji University, Gwalior (M.P)-474011-India
[2]Govt. S.L.P. College, Morar, Gwalior (M.P)-474006-India
*Email: naikraouf90@gmail.com

The primary goal in the synthetic organic chemistry is the use of less hazardous catalysts i.e. the evolution of environmentally benign and clean chemical processes. The acidic zeolites have been used in different areas of the organic chemistry, for not only performing the environmentally benign synthesis, but also for providing good yields [1]. Because of having tunable acidity and variety of structures and pore dimensions, they have received an increasing attention. Also, their low cost and excellent thermal stability makes them economically and environmentally feasible [2]. In this regard, we have chosen Nanoporous Zeolite H-A material for the efficient and benign synthesis of dihydropyrimidones.

The reusability of the nanoporous catalyst was also investigated to find out the stability of the catalyst as presented in the Table 1. As indicated from the table, there is no significant reduction in the yield % upto 4 cycles.

Table 1: Reusability of the Catalyst

S. No.	Catalytic run	Reaction Time (min.)	Yield %
1.	1st run	30	92
2.	2nd run	30	92
3.	3rd run	30	91
4.	4th run	30	89

The effect of different amounts of nanoporous Zeolite H-A catalyst on the synthesis of DHPMs was also investigated at a temperature of 100 ºC for 30 minutes as presented in Figure 1. It has been found that with increase in weight of catalyst, there is significant increase in the % yield. The yield of the final product increases from 56 to 92% as we increase the weight of the catalyst from 50 to 200 mg, respectively. Further increase in weight of the catalyst causes no significant increase in yield but remains almost constant. This is attributed because the reactants may have got the sufficient acid sites to bind with.

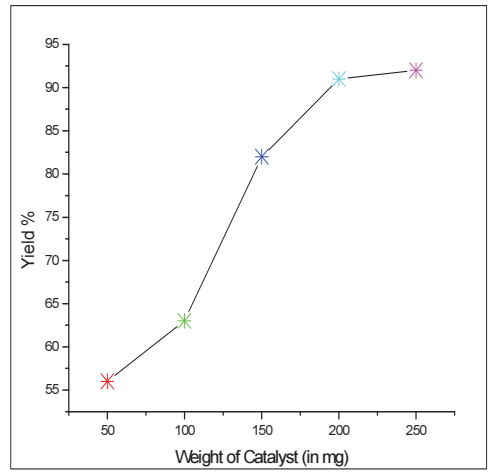

Figure 1: Effect of weight of the catalyst

The method employed is quite easy and selective as the nanoporous catalyst used can be separated by simple filtration and used for subsequent runs without any much loss in the yield. Also, this catalyst gives significant yields in shorter reaction times.

References

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