

# Ammonium Dihydrogen Phosphate Catalyst for One-Pot Synthesis of 3,4-Dihydropyrimidin-2(1H)-ones

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**摘要** A one-pot three component Biginelli condensation of different substituted aromatic and aliphatic aldehydes with ethyl acetoacetate and urea to the respective 3,4-dihydropyrimidin-2-(1H)-ones under solvent-free conditions that is simple, effective, and environmentally friendly was shown. Ammonium dihydrogen phosphate ( $\text{NH}_4\text{H}_2\text{PO}_4$ ) was used as a non-toxic, inexpensive, and easily available catalyst. The facile reaction condition and simple isolation and purification procedures of this method make it a good option for the synthesis of dihydropyrimidinones.

**关键词:** [3,4-dihydropyrimidin-2-\(1H\)-one](#) [ammonium dihydrogen phosphate](#) [solvent free](#) [condensation](#)

**Abstract:** A one-pot three component Biginelli condensation of different substituted aromatic and aliphatic aldehydes with ethyl acetoacetate and urea to the respective 3,4-dihydropyrimidin-2-(1H)-ones under solvent-free conditions that is simple, effective, and environmentally friendly was shown. Ammonium dihydrogen phosphate ( $\text{NH}_4\text{H}_2\text{PO}_4$ ) was used as a non-toxic, inexpensive, and easily available catalyst. The facile reaction condition and simple isolation and purification procedures of this method make it a good option for the synthesis of dihydropyrimidinones.

**Keywords:** [3,4-dihydropyrimidin-2-\(1H\)-one](#), [ammonium dihydrogen phosphate](#), [solvent free](#), [condensation](#)

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- [1] Weber L. Drug Discov Today, 2002, 7: 143
- [2] Kappe C O. Eur J Med Chem, 2000, 35: 1043 
- [3] Kamal A, Shaheer Malik M, Bajee S, Azeeza S, Faazil S, Ramakrishna S, Naidu V G M, Vishnuwardhan M V P S. Eur J Med Chem, 2011, 46: 3274 
- [4] Akhaja T N, Raval J P. Eur J Med Chem, 2011, 46: 5573 
- [5] Russowsky D, Canto R F S, Sanches S A A, D'Oca M G M, de Fátima A, Pilli R A, Kohn L K, António M A, de Carvalho J E. Bioorg Chem, 2006, 34: 173 
- [6] Fattorusso E, Tagliatela-Scafati O eds. Modern Alkaloids: Structure, Isolation, Synthesis and Biology. Weinheim: Wiley-VCH, 2008 
- [7] Biginelli P. Gazz Chim Ital, 1893, 23: 360
- [8] Wipf P, Cunningham A. Tetrahedron Lett, 1995, 36: 7819 
- [9] Hajipour A R, Seddighi M. Syn Commun, 2012, 42: 227 
- [10] Yu J, Shi F, Gong L-Z. Acc Chem Res, 2011, 44: 1156 

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- [11] Li N, Chen X-H, Song J, Luo S-W, Fan W, Gong L-Z. J Am Chem Soc, 2011, 132: 10953
- [12] Radha Rani V, Srinivas N, Radha Kishan M, Kulkarni S J, Raghavan K V. Green Chem, 2001, 3: 305 
- [13] Choudhary V R, Tillu V H, Narkhede V S, Borate H B, Wak-harkar R D. Catal Commun, 2003, 4: 449 
- [14] Saloutin V I, Burgart Y V, Kuzueva O G, Kappe C O, Chu-pakhin O N. J Fluor Chem, 2000, 103: 17 
- [15] Hu E H, Sidler D R, Dolling U H. J Org Chem, 1998, 63: 3454 
- [16] Kappe C O, Falsone S F. Synlett, 1998: 718
- [17] Bigi F, Carloni S, Frullanti B, Maggi R, Sartori G. Tetrahedron Lett, 1999, 40: 3465 
- [18] Ranu B C, Hajra A, Jana U. J Org Chem, 2000, 65: 6270 
- [19] Yadav J S, Reddy B V S, Bhaskar Reddy K, Sarita Raj K, Prasad A R. J Chem Soc, Perkin Trans 1, 2001: 1939
- [20] Kumar K A, Kasthuraiah M, Reddy C S, Reddy C D. Tetrahedron Lett, 2001, 42: 7873 
- [21] Shaabani A, Bazgir A, Teimouri F. Tetrahedron Lett, 2003, 44: 857 
- [22] Alizadeh M H, Tayebee R. J Braz Chem Soc, 2005, 16: 108 
- [23] Tayebee R. J Kor Chem Soc, 2008, 52: 23 
- [24] Tayebee R, Alizadeh M H. Monatsh Fur Chem, 2007, 138: 763 
- [25] Tayebee R. Chin J Chem, 2008, 26: 2273 
- [26] Tayebee R, Alizadeh M H. Monatsh Fur Chem, 2006, 137: 1063 
- [27] Tayebee R, Alizadeh M H, Kamini J, Kulkarni M, Raghavas-wamy V, Roy P S, Mishra P K. Curr Sci, 2007, 93: 133
- [28] Tayebee R, Mahdavi B. Asian J Chem, 2009, 21: 1565
- [29] Tayebee R. Chin J Chem, 2007, 25: 1031 
- [30] Rezaei-Seresht E, Zonoz F M, Estiri M, Tayebee R. Ind Eng Chem Res, 2011, 50: 1837 
- [31] Mahdavinia G H, Rostamizadeh S, Amani A M, Emdadi Z. Ultrasonics Sonochem, 2009, 167
- [32] Zendehtel M, Mobinikhaledi A, Asgari A. J Inclusion Phenom Macrocycl Chem, 2008, 60: 353 
- [33] Adharvana Chari M, Syamasundar K. J Mol Catal A, 2004, 221: 137 
- [34] Shaabani A, Bazgir A. Tetrahedron Lett, 2004, 45: 2575 
- [35] Gangadasu B, Palaniappan S, Rao V J. Synlett, 2004: 1285
- [36] Mitra A K, Banerjee K. Synlett, 2003: 1509 
- [37] Fu N-Y, Yuan Y-F, Cao Z, Wang S-W, Wang J-T, Peppe C. Tetrahedron, 2002, 58: 4801 
- [38] Yadav J S, Reddy B V S, Srinivas R, Venugopal C, Ramalin-gam T. Synthesis, 2001, 1341
- [39] Lu J, Bai Y J, Wang Z J, Yang B Q, Ma H R. Tetrahedron Lett, 2000, 41: 9075 
- [40] Hazarkhan H, Karimi B. Synthesis, 2004: 1239
- [41] Venkateshwar Reddy Ch, Mahesh M, Raju P V K, Ramesh Babu T, Narayana Reddy V V. Tetrahedron Lett, 2002, 43: 2657 

- [1] 刘丽丽, 张鑫, 高金森, 徐春明. Au/MOF 催化剂的制备、表征及其催化三组分偶联反应[J]. 催化学报, 2012,33(5): 833-841
- [2] 赵俊理, 钱广, 李风云, 朱杰, 季生福, 李蕾. Bi-MCM-41 催化对氯甲苯选择氧化[J]. 催化学报, 2012,33(5): 771-776
- [3] 倪晔, 张蓓花, 孙志浩. 采用通透性处理的安大略假丝酵母全细胞高效合成 (R)-2-氯-1-(3-氯苯基)乙醇[J]. 催化学报, 2012,33(4): 681-687
- [4] 宋昊, 赵永杰, 张颖鑫, 孔维宝, 夏春谷. 脂肪酶催化缩聚法合成可完全降解的聚羟基丙酸酯[J]. 催化学报, 2012,33(3): 432-438
- [5] Razieh FAZALI, Hamid ALIYAN, Shahram TANGESTANINEJAD, Esmaeel MOHAMMADI, Maryam BORDBAR. Nanocasting, Template Synthesis, and Structural Studies on Cesium Salt of Phosphotungstic Acid for the Synthesis of Novel 1,3,5-Triaryl-pyrazoline Derivatives[J]. 催化学报, 2012,33(2): 237-246
- [6] WEI Yingxu, ZHANG Dazhi, LIU Zhongmin, SU Bao-Lian. Methyl Halide to Olefins and Gasoline over Zeolites and SAPO Catalysts: A New Route of MTO and MTG[J]. 催化学报, 2012,33(1): 11-21
- [7] 刘广宇, 田鹏, 刘中民. 二乙胺导向合成 SAPO-34 及与其它模板剂的对比[J]. 催化学报, 2012,33(1): 174-182
- [8] 任利敏, 张一波, 曾尚景, 朱龙凤, 孙琦, 张海燕, 杨承广, 孟祥举, 杨向光, 肖丰收. 由新型铜胺络合物模板剂设计合成活性优异的 Cu-SSZ-13 分子筛[J]. 催化学报, 2012,33(1): 92-105
- [9] Shekoofeh TAYEBI, Mojtaba BAGHERNEJAD, Dariush SABERI, Khodabakhsh NIKNAM. Sulfuric Acid ([3-(3-Silicapropyl)sulfanyl]propyl)ester as a Recyclable Catalyst for the Synthesis of 4,4'-(Arylmethylene)bis(1H-pyrazol-5-ols)[J]. 催化学报, 2011,32(9): 1477-1483
- [10] Masoud NASR-ESFAHANI, S. Jafar HOSEINI, Fatemeh MOHAMMADI. Fe<sub>3</sub>O<sub>4</sub> Nanoparticles as an Efficient and Magnetically Recoverable Catalyst for the Synthesis of 3,4-Dihydropyrimidin-2(1H)-ones under Solvent-Free Conditions[J]. 催化学报, 2011,32(9): 1484-1489

- [11] 杨杰, 吴伟, 周亚静, 武光, 赵爱娟, 基赫佳宁 O V, 托克塔列夫 A V, 伊切夫斯基 G V.SAPO-31 分子筛的微波加热合成、表征及催化性能[J]. 催化学报, 2011,32(7): 1234-1241
- [12] 王来来, 张勤生, 崔玉明. 苯乙烯不对称三氟化反应一步合成手性 2-氧代-3-苯基戊二酸二甲酯[J]. 催化学报, 2011,32(7): 1143-1148
- [13] 张志萍, 赵岩, 吴宏宇, 谭伟, 王祥生, 郭新闻. 改性纳米 HZSM-5 催化剂上甲苯与甲醇的烷基化反应[J]. 催化学报, 2011,32(7): 1280-1286
- [14] 邹晓兰, 于艳卿, 李超峰, 朱校斌. 纳米  $\text{Cu}_2\text{O}$ /珍珠贝壳复合光催化材料的制备及其在有机染料处理中的应用[J]. 催化学报, 2011,32(6): 950-956
- [15] 刘致强, 唐磊, 常丽萍, 王建成\*, 鲍卫仁. Cu-SAPO-34/堇青石的原位制备及其催化丙烷还原柴油机尾气中  $\text{NO}_x$  [J]. 催化学报, 2011,32(4): 546-554