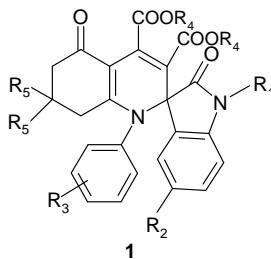


Abstract

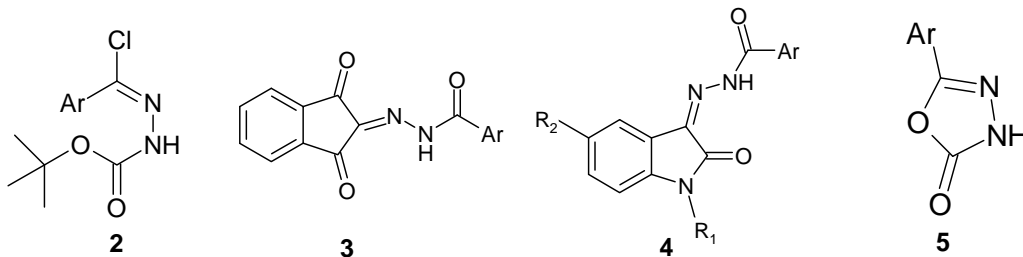
Name of the Candidate: Kamalesh Debnath

Ph.D. Registration No.: 1161 Ph. D. (Sc.) Proceed / 13, Dated 21/02/2013

The thesis entitled “**Green synthesis of biologically important molecular scaffolds using solid supports and heterogeneous catalysts**” is comprised of five relevant chapters. The main objective of the thesis is to synthesis various biologically important molecular scaffolds using solid supports and heterogeneous catalysts either in presence of environmentally benevolent solvent, water or under solvent-free conditions. **Chapter 1** presents facile synthesis of multi-functionalized spiro[indoline-3,2'-quinoline] derivatives (**1**) from isatins using bimetallic $ZnFe_2O_4$ nanopowder as a dual Lewis acid-base combined catalyst in water medium.

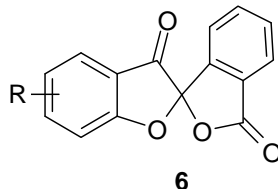


Chapter 2 furnishes the green synthesis of biologically important ninhydrin and isatin based hydrazones (**3** and **4**) and 5-aryl-3H-[1,3,4]oxadiazol-2-ones (**5**) from intermediate *N'*-(chloro-aryl-methylene)-*tert*-butylcarbazates (**2**). The synthesis of hydrazones **3** and **4** has been achieved using PEG-OSO₃H as a recoverable and biodegradable polymeric acid-surfactant combined catalyst in water medium. Oxadiazoles **5** were synthesised from **2** employing basic alumina as an efficient and recyclable solid support under solvent-free conditions.

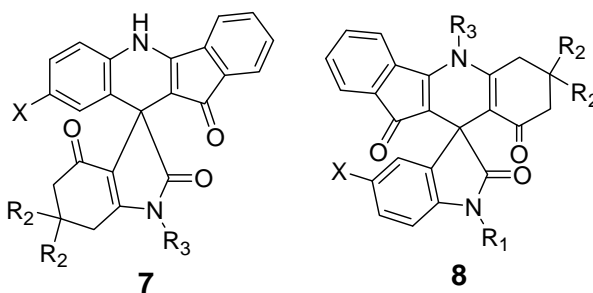


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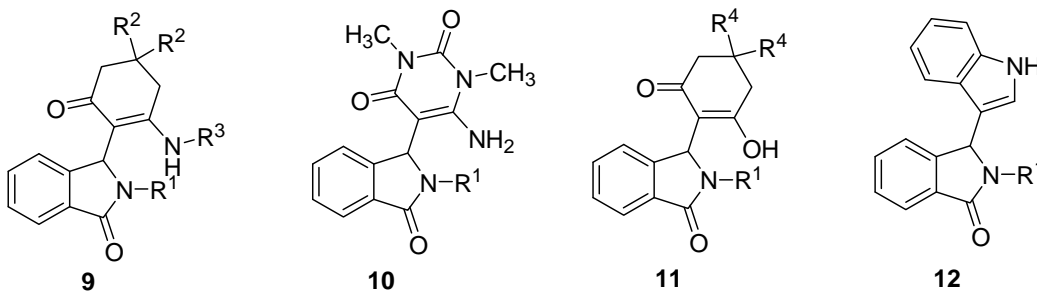
Chapter 3 describes solvent-free synthesis of 3*H*,3'*H*-spiro[benzofuran-2,1'-isobenzofuran]-3,3'-diones (**6**) from ninhydrin using silica sulphuric acid (SSA) as solid acid support. The dual characteristics of SSA, as an activating agent as well as oxidizing agent, have been well exposed in these syntheses.



Chapter 4 embodies synthesis of two types of spiroindole fused dihydropyridine derivatives such as spiro[indolo-3,10'-indeno[1,2-*b*]quinolin]-2,4,11'-triones (**7**) and indenoquinoline-spirooxindoles (**8**) from isatins using magnetically separable Fe₃O₄-SO₃H nanoparticles as solid acid support under solvent-free conditions.



In **Chapter 5** the synthesis of a series of multi-functionalized 2,3-disubstituted isoindolin-1-ones (**9-12**) has been described where the ZrO₂ nanoparticles have been exploited as a dual acid-base solid support under solvent-free conditions.



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