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Exploiting Intramolecular Hydrogen Bonding for Stereo Selective Synthesis

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A new prospective in stereo selective methodology: Intramolecular hydrogen bonding directed highly stereo specific, transition metal free synthetic protocol for amide substituted β-aminoenones has been reported. High stereo selectivity, atom efficiency, excellent yields and high purity were achieved by just filtration and drying without using any metal catalyst or column chromatographic purifications. To the best of our knowledge, metal-free synthesis of stereo defined β-aminoenones is not yet reported. Toxic solvents like dioxane, N,N-dimethylformamide (DMF) and tetrahydrofuran were replaced by methanol and by product is just ethanol. High stereo selectivity, atom efficiency, excellent yields and high purity were achieved by just filtration and drying without any column chromatographic purifications. Synthetic versatility of this method has been explored by using different classes of amines such as aliphatic amines, aryl amines, chiral amino acids, hetero aryl amines, amino sugars, nucleobases, nucleosides and diamines. The reported method offers lot of advantages such as: high stereo selectivity, mild reaction conditions, less solvent usage, tolerant to lactones and high purity with enantiomeric ratio up to 100:0 when used chiral amines. Out of 31 examples 20 were synthesized in gram scale which demonstrates the simplicity of the protocol. Systematically, we have confirmed the role of dual IMHB (C=O···H–N) on Z-direction using single-crystal X-ray structure and 1D, 2D NMR studies. Our strategy may open new prospective in the field of stereo selective synthesis.

Biography:

Palaniraja Subramaniam has his expertise in synthesis of wide variety of organic molecules and Green Chemistry. He started his career as a chemist in Sigma-Aldrich, Bangalore, India in 2006. Has 13 years of experience in manufacturing, R&D, process optimisation, Custom Synthesis, Green chemistry re-engineering, Technology transfer, Scale-up, new product introduction etc., Currently, leading a team of scientists in Merck and handling new products development. Part of his Ph.D research he worked on developing a metal free and stereo selective synthetic protocol for amide substituted β-aminoenones using the intramolecular hydrogen bond formation as a stereo selective control tool.