

**Ph. D. Seminar-II**  
**Acid Promoted Cyclizative Coupling Reactions of Alkynes and Carbinols**

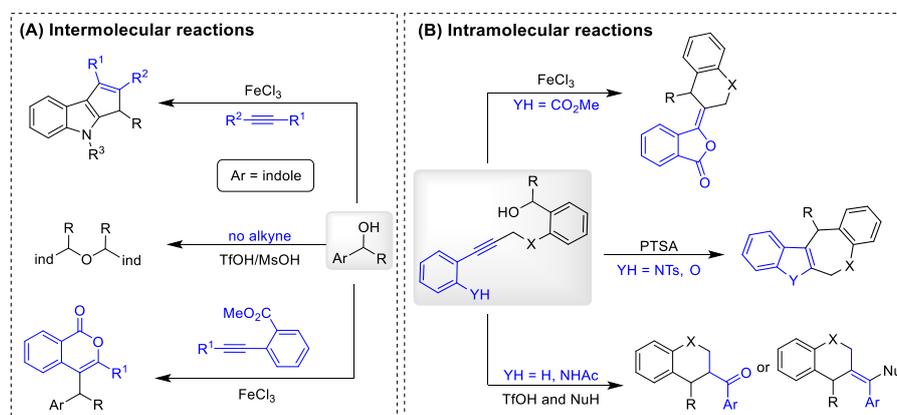
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**Date:** 12-09-2019

**Venue:** CB 310

**Time:** 3.00 PM

The development of synthetic methods for the construction of C-O, C-N, C-C etc. bonds have found great attention in synthetic organic chemistry, both intermolecular as well as intramolecular fashion. Among many, the reactions between alcohols and unsaturated C-C bonds (i.e., olefins and alkynes) are very important.<sup>1</sup> We have been working on the discovery of novel reactions using alkynes and alcohols as reacting partners, employing Lewis acid as well as Brønsted acid as promoters for the generation of structurally complex heterocyclic systems.<sup>2</sup> During this study we found that, the reaction outcome is highly dependent on the structure of the alkyne and nature of alcohol. A novel method for cyclopenta[*b*]indole frameworks from 3-indolylmethanols and alkynes through a formal [3+2] annulation using FeCl<sub>3</sub> has been developed.<sup>3</sup> We have serendipitously discovered and developed a prototypical method for the synthesis and isolation of oxybis(methylene-indole) derivatives. The reactivity of these ethers has also been studied under various parameters.<sup>4</sup> Further, we have also developed a strategy for the synthesis of isocoumarin and phthalide frameworks *via* a cyclizative coupling process between 2-alkynylbenzoates (β-alkynylenoates) and alcohols in both intra- and intermolecular fashion.<sup>5</sup> A series of cyclohepta[*b*]indole, cyclohepta[*b*]benzofuran and tetrahydro-2*H*-pyran derivatives were also synthesized by changing substituent on alkyne partner from *ortho*-ester to amine, alcohol and to hydrogen respectively.<sup>6</sup> The details of these developments will be discussed in the seminar.



**Scheme:** Developed acid catalyzed cyclizative coupling reactions between alkynes and carbinols

**References:** [1] a) Kumar, R.; Van der Eycken, E. V. *Chem. Soc. Rev.* **2013**, 42, 1121. b) Naredla, R. R.; Klumpp, D. A. *Chem. Rev.* **2013**, 113, 6905. [2] a) Gandhi, S.; Tharra, P.; Baire, B. *Chem. Select.* **2017**, 2, 1058. b) Gandhi, S.; Baire, B. *Chem. Select* **2017**, 2, 3964. c) Gandhi, S.; Baire, B. *Chem. Select* **2018**, 3, 4490. [3] Gandhi, S.; Baire, B. *J. Org. Chem.* **2019**, 84, 3904. [4] Gandhi, S.; Baire, B. *Unpublished results*. [5] Gandhi, S.; Baire, B. Manuscript under preparation. [6] Gandhi, S.; Baire, B. *Unpublished results*.

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