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# Simple Brønsted acids as bi-functional catalysts in stereospecific nucleophilic substitution of stereogenic alcohols and direct nucleophilic substitution of aryl methy ethers and phenols

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We have discovered that simple Brønsted acids such as phosphinic acid can act as a bifunctional catalyst to promote a stereospecific intramolecular nucleophilic substitution reaction of stereogenic alcohols through a preferred cyclic transition state to generate optically pure tetrahydrofuran, pyrrolidine, and tetrahydrothiophene derivatives in good to excellent yields. Machanistic investigations revealed that an SN2 type mechanism was operating in contrast to other Lewis acid catalysts, where, the mechanism reported to be SN1 type. Density functional theory calculations revealed that phosphinic acid was operated as a bifunctional catalyst where the acidic proton of the catalyst protonated the hydroxyl group, enhancing the leaving group ability. Simultaneously, the oxo group of the catalyst abstracted the nucleophilic proton and thus enhancing the nucleophilicity. Subsequently, similar bifunctional mode of activation of other Brønsted acids, such as, triflic acid and para-toluenesulfonic acid were found to operate for direct nucleophilic substitution of aryl C-OMe and aryl C-OH bonds, respectively, by different uncharged nucleophiles.

## Biography

Srijit Biswas has completed his PhD from Jadavpur University, Kolkata India in April 2011 with Prof. Umasish Jana. After his thesis submission, he was offered a Post-doctoral position funded by the Wenner Gren foundations, Stockholm, Sweden to join Prof. Joseph Samec's group in Uppsala University at the end of 2010. After three and half years' of Post-doc in Samec's group, he obtained DST-Inspire Faculty position and started his independent research career in July, 2014 at Centre of Bio-Medical Research, Lucknow, India under the directorship of Prof. Ganesh Pandey. He has published more than 20 papers in journals of international repute till date.

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