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Liquid SO_2 as a Solvent for Organic Transformations

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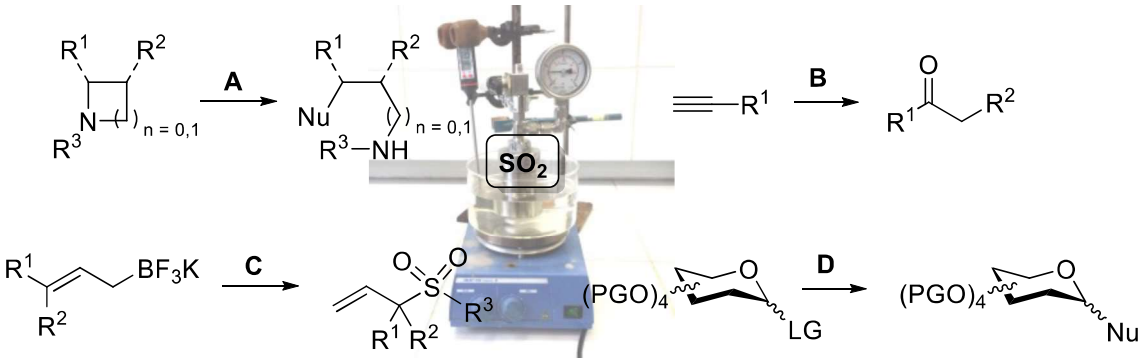
In recent years, many applications of SO_2 and its surrogates in organic synthesis have been reported.[1] Due to high polarity and Lewis acid properties sulfur dioxide can be used as strongly ionizing solvent. Furthermore, it has a high dipole moment (1.61 D), therefore it readily can dissolve both organic and inorganic compounds. On the other hand, SO_2 has been reported as a reaction medium for processes involving carbenium ions. This has prompted us to search for organic reactions that would profit from their running in liquid SO_2 as a reaction medium.

We have discovered that different aziridines and azetidines undergo efficient ring-opening reactions in liquid SO_2 with metal halides and thiols as nuchleophile sources (transformation A).[2,3]



Scheme 1: Organic transformation in liquid SO_2

We have also found that liquid SO_2 facilitates synthesis of substituted ketones (transformation B). Different Lewis acids were tested for the ability to promote this transformation in SO_2.

A novel method for the synthesis of sulfones also has been elaborated. Major step for further sulfone generation is bora-*ene* reaction of sulfur dioxide and substituted potassium trifluoroborate giving mixed sulfinic/boric anhydrides (transformation C).[4]

Additionally, we have investigated glycosylation reaction with a wide range of O-, and S-nucleophiles of different monosaccharides in liquid SO_2 (transformation D).

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