

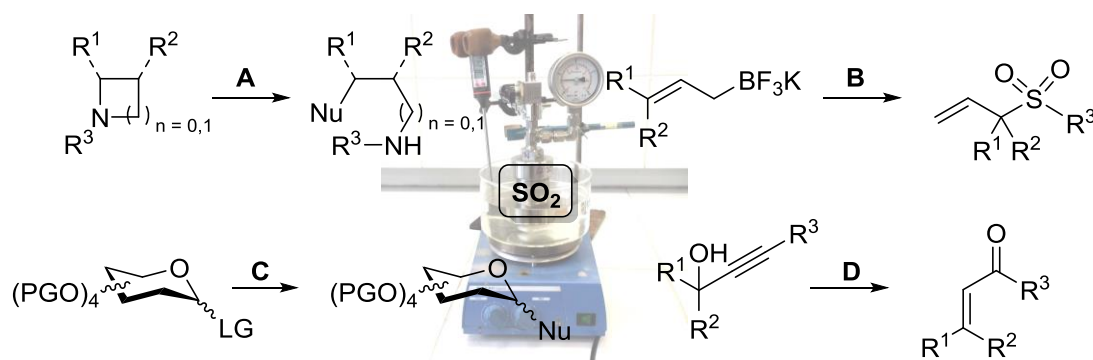
Application of liquid sulfur dioxide as a solvent for organic transformations

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In recent years, many applications of SO₂ 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, SO₂ 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 SO₂ as a reaction medium.

We have discovered that different aziridines and azetidines undergo efficient ring-opening reactions in liquid SO₂ with metal halides and thiols as nucleophile sources (transformation A) [2,3].



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 B).

We investigated glycosylation reaction with a wide range of O-, and S-nucleophiles of different monosaccharides in liquid SO₂ (transformation C).

We have also found that liquid SO₂ facilitates Meyer-Schuster and Rupe rearrangement reactions (transformation D).

Literature:

- [1] J. Lugiņina, Synlett, 2014, 25, 2962.
- [2] J. Lugiņina, J. Uzuleņa, D. Posevins, M. Turks, Eur. J. Org. Chem. 2016, 1760.
- [3] J. Lugiņina, M. Turks, Synlett, 2017 in press (DOI: 10.1055/s-0036-1588670).