

XXII International Conference on Organic Synthesis

16-21 September 2018, Florence, Italy



SCIENTIFIC PROGRAM & ABSTRACT BOOK

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Organic Transformations in and with Liquid Sulfur Dioxide

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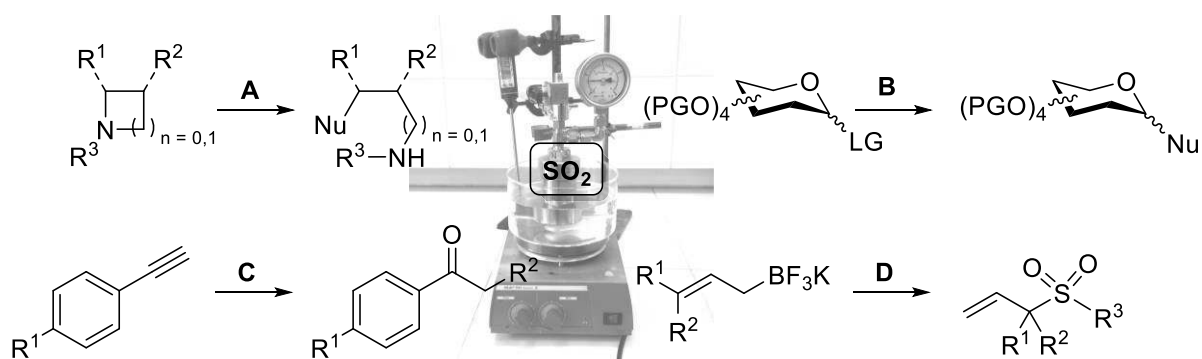
In recent years, many applications of SO₂ and its surrogates in organic synthesis have been reported [1]. Due to high polarity and Lewis acid properties sulfur dioxide can be used as strongly ionizing solvent. Furthermore, it has a high dipole moment (1.61 D), therefore it readily can dissolve both organic 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 protected and unprotected aziridines and azetidines undergo efficient ring-opening reactions in liquid SO₂ with metal halides and thiols as nucleophile sources (transformation A) [2,3].

We investigated glycosylation reaction with a wide range of *O*-, and *S*-nucleophiles of different monosaccharides which is facilitated by Lewis acidic and cation stabilizing properties of liquid SO₂ (transformation B).

We elaborated conditions for ketone synthesis from aromatic alkynes and different alcohols as carbocation source in the presence of Lewis acids in liquid SO₂ (transformation C).

A novel method for the synthesis of sulfones also has been elaborated. The main novelty is *bora-ene* reaction between sulfur dioxide and substituted potassium trifluoroborate giving mixed sulfinic-boric anhydrides. The latter are transformed into stable sulfones upon alkylation (transformation D) [4].



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