Organocatalytic addition on 1,2 bis-activated vinyl sulfones leading to an unprecedented rearrangement

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Abstract:
1,2 vinyl sulfones used in aminocatalysis lead us to observe an unprecedented rearrangement leading fastly to useful gem-disulfones. Using aminopyrrolidine organocatalysts, the 1,2-sulfone shift was generalised leading to highly versatile adducts using either ketones, aldehydes, or even using Bronsted base catalysis. It represents a valuable alternative for the $\alpha$-alkylation of carbonyl compounds.

First attempts using 1,2 vinyl sulfones:

- **E vinyl sulfone**
  - Reaction with pyridine in various solvents.
  - Low conversion or even not observed.

- **Z vinyl sulfone**
  - Reaction with pyridine in 1,4-dioxane.
  - Full conversion to a mixture of products.

Scope of the reaction:

- Various compounds undergo the reaction with different results in terms of yield and stereoselectivity.

Proposed mechanism:

- Protonation leads to the rearranged product.

Mechanistic observations:

- Different diastereoselectivity depending on the Z or E isomer and on the catalyst.
- Rearrangement using Bronsted base catalysis.

Catalyst screening:

- A range of catalysts were tested, leading to varying results in terms of yield and stereoselectivity.

References: