

## The Tandem [4+3]/[3+2] Cycloaddition of Nitroalkenes as a Discover Tool: Exploring Phase Transfer Catalysis

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Enantioselective, phase transfer catalysis (PTC) has become a synthetically useful process for carbon-carbon bond formation. Extension of this reaction manifold to its full potential (any anionic reaction) has been met with limited success. Presumably, this limitation results from the difficulty of preparing structurally diverse, chiral, non-racemic quaternary ammonium ions. The resulting lack of understanding of the structure and activity of quaternary ammonium ion pairs makes enantioselective phase transfer catalyst design difficult.

To overcome this difficulty, the tandem inter [4+2]/intra [3+2] cycloaddition of nitroalkenes has been utilized to construct rigid, suitably functionalized, cyclic amines. The amines serve as a scaffold allowing for the construction of a library of enantio-enriched quaternary ammonium ions in a parallel fashion. The synthetic route allows for the facile introduction of a variety of sterically and electronically variable groups selectively. The structure-activity/selectivity relationships of these quaternary ammonium ions as enantioselective phase transfer catalysts is being investigated. Development of the synthetic route and library screening results will be presented.

