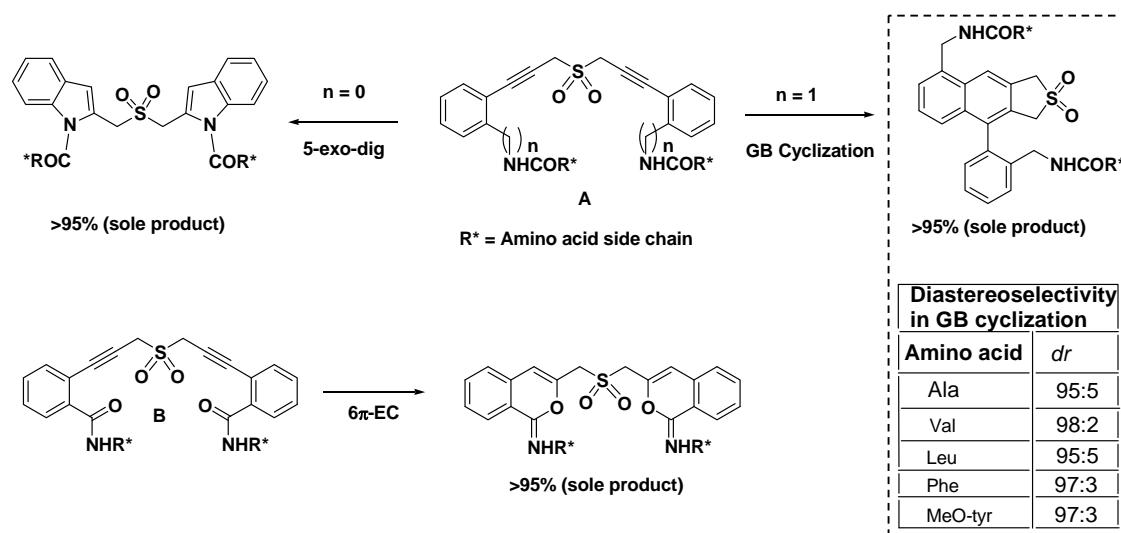


Abstract

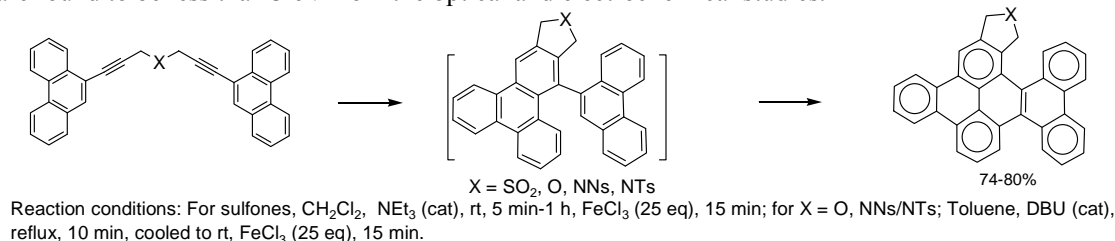
Studies on the Reactivity of *Bis*-propargyl Aryl Sulfones, Ethers and Sulphonamides: Synthesis of *Bis*-indoles, *Bis*-isochromenes, Polyaromatics and Chiral Aryl Naphthalene–Amino Acid Hybrids

A series of C_2 -symmetric *bis*-propargyl sulfones has been synthesized to check their preferred mode of reaction under basic condition, namely intramolecular *bis*-Michael type addition and Garratt-Braverman (GB) cyclization along with selectivity issues. For *bis*-propargyl sulfones of the type **A** with an *ortho*-aminoacyl amino acid ($n=0$) we found that the major pathway followed was isomerization followed by intramolecular addition of the amide nucleophile *via* the nitrogen in *5-exo-dig* fashion to form *bis*-indoles in high yields whereas the *bis*-(*o*-amidomethyl phenyl propargyl) sulfones ($n=1$) underwent GB rearrangement in near quantitative yield with high degree of diastereoselectivity in terms of axial chirality. *Bis*-allenic sulfones with *ortho*-amido linkage of type **B** furnished *bis*-isochromene derivatives in excellent yield possibly through a rapid 6π -electrocyclization (**Scheme 1**).



Scheme 1: Reactivity of sulfones **A** and **B**

The molecular framework of the GB cyclization product has been exploited in the synthesis of a series of unique acene–helicene hybrids. A one-pot protocol by combining GB cyclization with Scholl oxidation has been developed for the synthesis (**Scheme 2**). The band gaps of these hybrid molecules are found to be less than 3 eV from the optical and electrochemical studies.



Scheme 2: One-pot synthetic protocol for acene–helicene hybrids

Key words: Garratt–Braverman, diastereoselectivity, axial chirality, acene, helicene, hybrids, Scholl, band gap.