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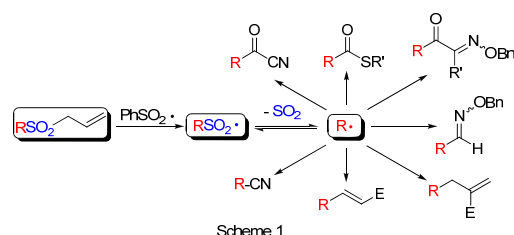


*Major Research Interests: Organic Synthesis*

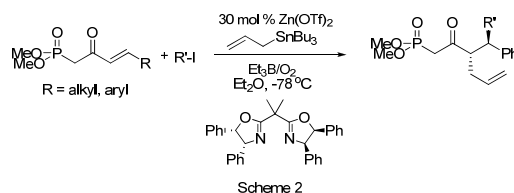
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Our research interests have been focused on the design and the development of new organic reactions, reagents, and strategies with general utility in organic synthesis.

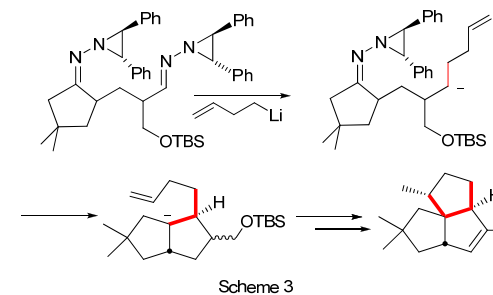
**Free radical reactions** have rapidly emerged as powerful tools for carbon-carbon bond formation. Our long-standing interests in this area had led to develop (i) new types of radical rearrangements, (ii) novel radical cyclizations, and (iii) the application of radical reactions to natural product synthesis. Our studies on the indirect radical acylation approach provided several new directions in intermolecular radical reactions (1, 2). Our group has been also working on the development of non-stannane-mediated radical reactions based on  $\alpha$ -scission of alkylsulfonyl radicals (3) (Scheme 1). This project is exceedingly important for the application of radical reactions to the industrial process.



**Enantioselective** organic reactions using organophosphonates and organosulfonates templates have been studied and are synthetically useful for the Friedel-Crafts reaction, 1,3-dipolar cycloaddition (4), and radical-mediated conjugate addition reaction (Scheme 2) (5).



**Anionic cyclization** of *N*-aziridinylimines is another area of chemistry currently under investigation. This fundamentally novel anionic approach is based on the previously developed radical-mediated consecutive carbon-carbon bond formation in our group and turned out to be very effective for the construction of quaternary carbon centers (6). This strategy is directed to develop highly efficient synthesis of natural products (Scheme 3).



**Transition metal-mediated organic reactions** prove to be exceedingly powerful not only for the carbon-carbon bond formation but also for a variety of functional group transformations. Our studies on organometallic reactions aim to develop new synthetic methodologies using readily available cheap metal salts by controlling the reactivities via the modification of ligands.

### Selected Publications

1) Kim, S.; Lee, I-Y.; Yoon, J-Y.; Oh, D. H. Novel Radical Reaction of Phenylsulfonyl Oxime Ethers. A Free Radical Acylation Approach. *J. Am. Chem. Soc.* **1996**, *118*, 5138.

2) Kim, S.; Lim, C. J.; Song, C.; Chung, W-j. Novel Radical Alkylation of Carboxylic Imides, *J. Am. Chem. Soc.* **2002**, *124*, 14306.

3) Kim, S.; Kim, S. Tin-Free Radical Carbon-Carbon Bond-Forming Reactions Based on  $\alpha$ -Scission of Alkylsulfonyl Radicals, *Bull. Chem. Soc. Jpn.* **2007**, *80*, 809.

4) Lim, K-C.; Hong, Y-T.; Kim, S. Catalytic Asymmetric 1,3-Dipolar Cycloaddition Reaction with  $\alpha$ '-Phosphoric Enones by a Chiral Ligand-Copper (II) Triflate Complex, *Adv. Synth. Catal.* **2008**, *350*, 380

5) Lee, S.; Kim, S. Enantioselective Radical Conjugate Addition to  $\alpha$ '-Phosphoric Enones, *Org. Lett.* **2008**, *10*, 4255.

6) Kim, S.; Oh, D. H.; Yoon, J-Y. ; Cheong, J. Novel Anionic Cyclization of *N*-Aziridinylimines. An Efficient Route to Carbocycles via Consecutive Carbon-Carbon Bond Formation Approach, *J. Am. Chem. Soc.* **1999**, *121*, 5330.