

Recent Developments in the Synthesis of Unsymmetrical Disulfanes (Disulfides). A Review

Mateusz Musiejuk and Dariusz Witt

Department of Organic Chemistry, Chemical Faculty, Gdansk University of Technology, Gdansk, Poland

Introduction	96
I. Preparation of Unsymmetrical Disulfanes	97
II. Oxidation of Mixtures of Thiols or Derivatives	97
1. <i>Oxidation using Iodine</i>	97
2. <i>Oxidation using Hydrogen Peroxide</i>	99
3. <i>Oxidation using Dimethyl Sulfoxide</i>	100
4. <i>Oxidation using Diethyl Azodicarboxylate and Related Compounds</i>	100
5. <i>Oxidation using Dichlorodicyanoquinone</i>	102
III. Exchange Reactions	104
1. <i>Thiol-Disulfane Exchange Reactions</i>	104
2. <i>Rhodium-catalyzed Disulfane Exchange Reactions</i>	108
IV. Thioalkylation of Thiols - Thiolysis	110
1. <i>From 1-Chlorobenzotriazole</i>	110
2. <i>From Sulfenyl Chlorides</i>	111
3. <i>From Organophosphorus Sulfenyl Bromide</i>	113
4. <i>From Sulfenamides</i>	114
5. <i>From Thiosulfonates and Thiosulfates</i>	116
V. De-symmetrization of Functionalized Disulfanes	118
1. <i>From bis-(2-Hydroxyethyl)disulfane</i>	118
2. <i>From bis-(2-Aminoethyl) disulfane - Cystamine</i>	119
3. <i>From Disulfane with Carboxylic Groups</i>	121
VI. Miscellaneous Reactions	122
Conclusion	124
Acknowledgment	125
References	125