
PREFACE

Organosulfur compounds have received significant interest due to the presence in commonly found in foods, vegetables, and dietary items, providing various health benefits. Moreover, broad applications in different fields, including modern organic synthesis, medicinal chemistry, drug discovery, materials science, etc. It is worth noting that more than 300 sulfur-containing FDA-approved drugs are available in the market. Organosulfur compounds can be categorized according to different sulfur-based functional groups. Some of the common functional groups in organosulfur compounds include thiol, sulfide, sulfoxide, thioacetic acid, sulfonic acid, thioamide, sulfonamide, sulfoximine, sulfinic acid, thioimidates, dithiocarbamates, sulfone, etc.

In this context, the thesis entitled “**Formation of Carbon-Sulfur Bonds with Sp^2 and Sp^3 -Carbons Under Metal and Metal-Free Conditions.**” has focused on the development of routes for C-S bond formation under mild conditions. **Chapter 1** will present a comprehensive overview of several C-S bond-formation methods and their significance in both biological and synthetic domains. **Chapter 2** will highlight the procedure of synthesizing (3)-S-arylthioindoles from indole and thiophenols in water using potassium persulfate-glucose mediators. **Chapter 3**, will cover the methods of synthesizing thioimidates from thioamides and arylboronic acids using copper as a catalyst under mild conditions. **Chapter 4** will highlight a straightforward and efficient method for the synthesizing of various functionalized *S*-benzyl dithiocarbamates from α -aryl diazo esters via a multicomponent reaction involving carbon disulfide and amines. **Chapter 5**, will

discuss the process of synthesizing α -aryl sulfone propanamide from arylsulfonates using α -halohydroxamates at room temperature. In the end, **Chapter 6** will summarize and conclude the entire thesis work.