



Progress in Heterocyclic Chemistry: Chapter 4.1. Five-Membered Ring Systems: Thiophenes and Se/Te Derivatives

Edward R. Biehl

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This review covers 2012 literature on the synthesis chalcogens, namely, thiophenes, selenophenes, and tellurophenes. Accordingly, the synthesis of the parent rings of these chalcogens was prepared by catalyzed electrocyclic cyclization, Dieckmann-type cyclization, Gewald reaction, organic cascade, and domino cyclization reactions. Elaboration of the chalcogens involved: direct CH arylation, cyanation, and borylation without metallic reagents, cross-coupling reactions with Pd catalysis, direct carboxylation, and enantioselective organocatalyzed cross-aldol reactions. Further modification of the chalcogens rings includes decarbonylation, differential oxidation, and hydrodesulfurization. Several syntheses of important polymeric and conjugated material are discussed and their possible importance in material science is highlighted. New syntheses and applications of various novel chalcogens to medicinal chemistry are emphasized.

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