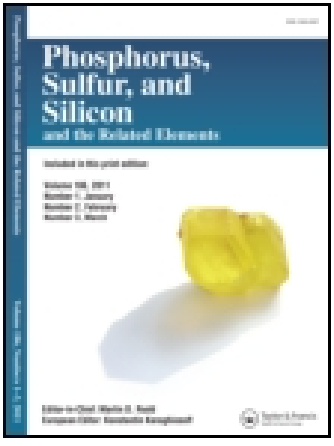

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Syntheses and Structures of Stable Sulfenyl Iodides Bearing Novel Bowl-Type and Dendrimer-Type Substituents

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Syntheses and Structures of Stable Sulfenyl Iodides Bearing Novel Bowl-Type and Dendrimer-Type Substituents

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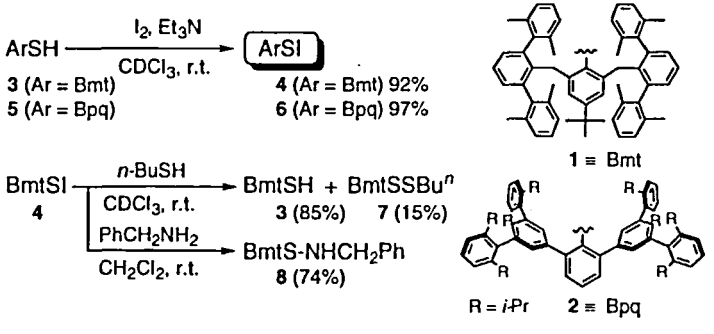
Arenesulfenyl iodides with unprecedented stability were synthesized by iodine oxidation of the corresponding arenethiols bearing bowl-type and dendrimer-type substituents. X-ray crystallographic analysis established their monomeric structures.

Keywords: sulfenyl iodides; steric protection; X-ray analysis; oxidation

Sulfenyl iodides (RSI) have been postulated as important intermediates of iodination reaction in the human thyroid gland as well as in iodine-oxidation of thiols. However, information about them is very scant because of their instability resulting from their very easy disproportionation reaction ($2RSI \rightarrow RSSR + I_2$) and no sulfenyl iodide stable at room temperature has so far been structurally characterized.[1] In order to clarify their role in the organic and biological reactions, it is considered to be prerequisite to study its chemistry by using a stable well-defined compound. Recently, we reported the synthesis of a stable

arenesulfenic acid by direct oxidation of a thiol by taking advantage of a novel bowl-type substituent.[2] Here we report the syntheses of arenesulfenyl iodides with unprecedented stability by iodine oxidation of the corresponding arenethiols along with their crystal structures.

Oxidation of thiol **3** bearing a bowl-type substituent **1** with an equimolar amount of I_2 in the presence of triethylamine resulted in the quantitative formation of sulfenyl iodide **4**, which was isolated by silica gel chromatography as dark brown crystals. The stability of **4** was remarkable both in the crystalline state and in solution; it showed a melting point at 257 °C and no decomposition was observed even after heating at 80 °C for 12 h in toluene-d_8. The structure of **4** was established by X-ray crystallographic analysis. It was found that the S–I functionality is surrounded by the two rigid *m*-terphenyl units and sufficiently separated from those of neighboring molecules. In spite of high thermal stability, **4** undergoes ready reactions with some reagents such as 1-butanethiol and benzylamine. A stable sulfenyl iodide was also synthesized by taking advantage of a novel dendrimer-type substituent **2**, which is more easily accessible. Iodine oxidation of thiol **5** afforded sulfenyl iodide **6**, whose structural analysis revealed that the molecular cleft of **2** effectively protects the S–I functionality.



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