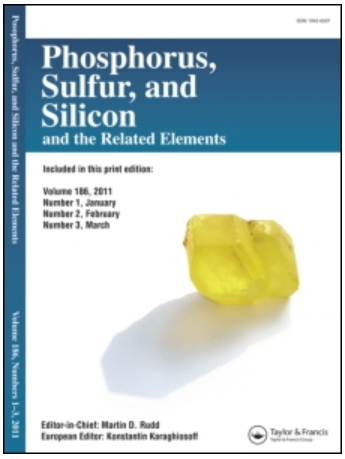

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New Procedures for the Oxidation of Sulfides to Sulfoxides and Sulfones

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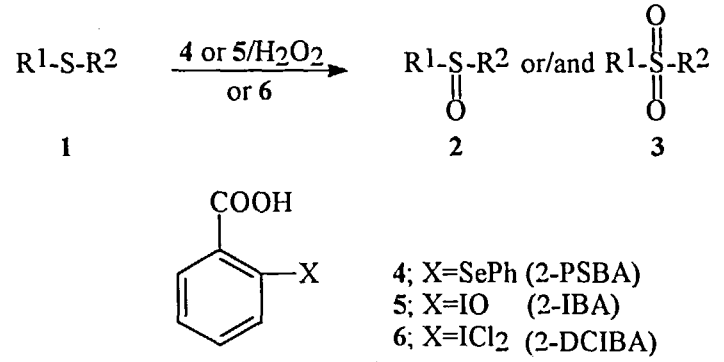
New reagents for the oxidation of sulfides to the corresponding sulfoxides and sulfones are presented.

A lot of interest has long been focused on the oxidation of sulfides to the corresponding sulfoxides and sulfones[1,2]. Recently, intensive efforts have been made to design catalytic oxidation processes based on the ecologically friendly and inexpensive hydrogen peroxide as oxygen donor[3]. Generally, for the activation of hydrogen peroxide two types of catalysts are commonly used, namely metal complexes and heteroorganic compounds. In continuation of our interest in the application of the second type of activators for such purposes[4], we would like to report that the oxidation of sulfides **1** to the corresponding sulfoxides **2** or sulfones **3** with hydrogen peroxide can be catalyzed effectively by 2-phenylselenobenzoic acid **4** or 2-iodosobenzoic acid **5**. We also observed that this type of oxidative conversion of divalent organosulfur compounds can be carried out using 2-dichloroiodobenzoic acid **6**.



These oxidation procedures may be applied to dialkyl, alkyl aryl and diaryl sulfides **1**. The data summarised in the Table 1 indicate that the oxidation with 2-IBA affords only sulfoxides **2**, whereas with 2-PSBA as a catalyst gives sulfoxides **2** or sulfones **3** depending from the reaction time.

Table 1

Oxidation of sulfides **1** to sulfoxides **2** or sulfones **3** with hydrogen peroxide/2-PSBA (or 2-IBA) reagent.

R	R^1	Oxidant[a]	Time [hrs]	Product	(yield, %)
Me	n-Pr	$4/H_2O_2$	144.0	3a	(84)
Me	n-Bu	$4/H_2O_2$	4.0	2b	(85)
		$4/H_2O_2$	144.0	3b	(86)
Me	Ph	$4/H_2O_2$	5.0	2c	(87)
		$4/H_2O_2$	120.0	3c	(96)
		$5/H_2O_2$	18.0	2c	(94)
Et	Ph	$4/H_2O_2$	2.5	2d	(100)
		$4/H_2O_2$	144.0	3d	(94)
		$5/H_2O_2$	23.0	2d	(97)
n-Bu	p-Tol	$4/H_2O_2$	5.5	2e	(90)
		$4/H_2O_2$	120.0	3e	(94)
		$5/H_2O_2$	17.0	2e	(87)
Ph	Ph	$4/H_2O_2$	144.0	3f	(90)

[a] all reactions were carried aut using 4 equivalents of hydrogen peroxide and 0.1 equivalent of a catalyst in methanol.

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