

NMR spectroscopy

^1H NMR spectra were measured on a Bruker DPX-250 spectrometer at 250.13 MHz in 5 mm glass tubes. Measurement parameters: spectral width 5 kHz, acquisition frequency 0.2 Hz, 45° pulse at 4.1 μs .

Diallyl sulfoxide

^1H NMR (CCl_4): δ 3.18-3.56 (m, 4H), 5.23-5.54 (m, 4H), 5.70-5.98 (m, 2H).

Pentamethylene sulfoxide

^1H NMR (CCl_4): δ 2.59-2.74 (m, 4H) 1.54-1.64 (m, 6H);

Pentamethylene sulfone

^1H NMR (CCl_4): δ 2.75-2.92 (m, 4H), 1.98-2.15 (m, 4H), 1.54-1.69 (m, 2H);

4-(methylsulfinyl)butan-1-ol

^1H NMR (CDCl_3): δ 3.72 (t, 2H, $J = 6.2$ Hz), 2.93-2.69 (m, 2H), 2.61 (s, 3H), 1.98-1.68 (m, 5H).

Selected ^1H NMR data of alkyl aryl sulfoxides and sulfones (CCl_4): δ PhSOCH_3 2.61 (s, 3H); PhSO_2CH_3 2.92 (s, 3H); *p*- BrPhSOCH_3 2.69 (s, 3H); *p*- $\text{BrPhSO}_2\text{CH}_3$ 3.05 (s, 3H); PhSOCH_2Ph 3.90 (m, 2H); $\text{PhSO}_2\text{CH}_2\text{Ph}$ 4.15 (s, 2H); $\text{PhCH}_2\text{SOCH}_2\text{Ph}$ 3.75 (m, 2H). ^1H NMR ($\text{CDCl}_3/\text{CCl}_4=1:1$): δ *p*- $\text{NO}_2\text{PhSOCH}_3$ 2.78 (s, 3H), *p*- $\text{NO}_2\text{PhSO}_2\text{CH}_3$ 3.08 (s, 3H).

Oxidation of tetrahydrothiopyran by H₂O₂ in the presence of Zn(NO₃)₂·6H₂O

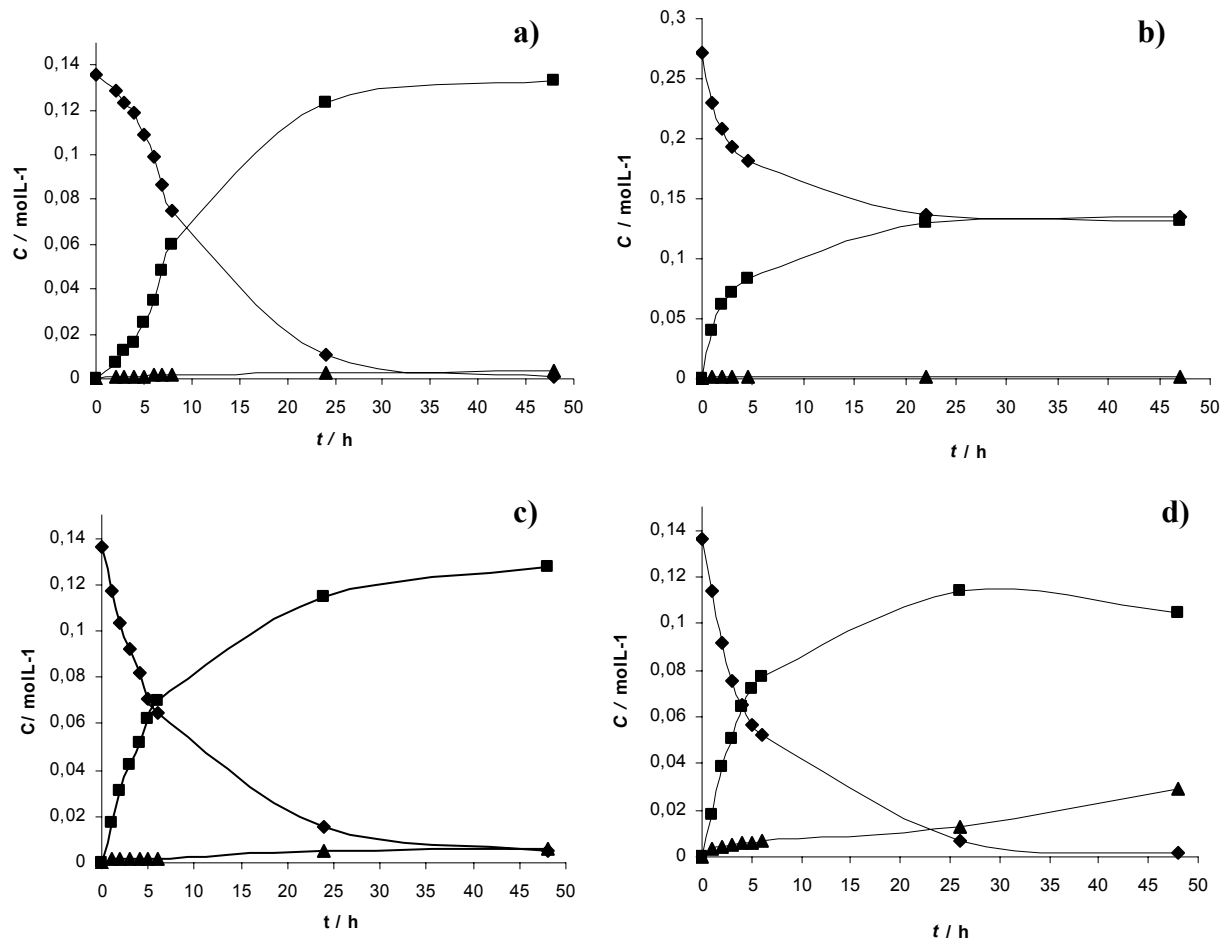


Fig. 1S Oxidation of tetrahydrothiopyran by H₂O₂ in the presence of Zn(NO₃)₂·6H₂O (0.1 eq. of Zn) in acetonitrile: a) R₂S:H₂O₂=1:1, H₂O₂ was added in parts in two hours; b) R₂S:H₂O₂=2:1; c) R₂S:H₂O₂=1:1, with H₂O(20 μL); d) R₂S:H₂O₂=1:1.5.

Catalytic oxidation of diaryl sulfides by H₂O₂ in the presence of Zn(NO₃)₂·6H₂O

Table 1S Catalytic oxidation of diaryl sulfides by H₂O₂ in the presence of Zn(NO₃)₂·6H₂O.

No	Substrate	Conversion, % ^a	Selectivity, % ^b
1	PhSCH ₂ Ph	80	99.8
2	PhCH ₂ SCH ₂ Ph	97	99.5

Reaction conditions: sulfide (0.17 mmol), Zn(NO₃)₂·6H₂O (0.017 mmol) and 30% aqueous H₂O₂ (0.2 mmol) in CH₃CN (1.5 mL), 16 h at room temperature.

^a Conversion = 100% * ([RSOR'] + [RSO₂R']) / ([RSOR'] + [RSO₂R'] + [RSR']).

^b Selectivity = 100% * [RSOR'] / ([RSOR'] + [RSO₂R']).