Russian Journal of Organic Chemistry, Vol. 39, No. 12, 2003, pp. 1801–1802. Translated from Zhurnal Organicheskoi Khimii, Vol. 39, No. 12, 2003, pp. 1872–1873.

SHORT COMMUNICATIONS

Arylsulfonylaziridines and Arylsulfonylaminoethenes from *N*-(1-Aryl-2,2-dichloro-2-phenylethyl)arenesulfonamides

G. N. Rozentsveig, I. B. Rozentsveig, G. G. Levkovskaya, A. I. Albanov, and A. N. Mirskova

Favorskii Irkutsk Institute of Chemistry, Siberian Division, Russian Academy of Sciences, ul. Favorskogo 1, Irkutsk, 664033 Russia
e-mail: i_roz@irioch.irk.ru

Received June 27, 2003

While continuing our systematic studies on the properties of *N*-(1-aryl-2,2-dichloro-2-phenylethyl)-arenesulfonamides, which were prepared in two steps from accessible *N*,*N*-dichloroarenesulfonamides, phenylacetylene, and aromatic compounds [1, 2], we have found that amides **Ia**, **Ib**, and **II** behave unexpectedly differently under the action of NaOH in organic solvents. The reaction result depends on the aromatic substituent in the α-position of the ethyl fragment. Tolyl derivatives **Ia** and **Ib** were converted into the corresponding 1-arylsulfonyl-2-chloro-2-phenyl-3-(4-tolyl)aziridines **IIIa** and **IIIb** in up to 60% yield. Under the same conditions, the reaction with *p*-methoxyphenyl derivative **II** invloved dehydrochlorination to afford 2-chloro-1-(4-chlorophenylsulfonylamino)-1-(4-methoxyphenyl)-2-phenylethene (**IV**) (Scheme (1). No such transformations occurred with *N*-(2,2,2-trichloro-1-arylethyl)- and *N*-(2,2-dichloro-1-arylethyl)sulfonamides.

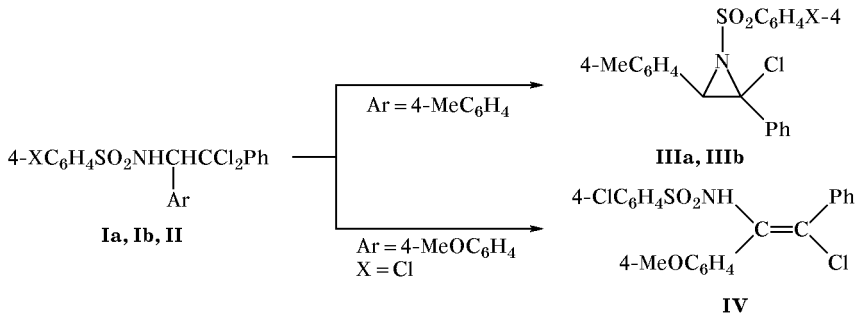
The ^{1}H and ^{13}C NMR spectra of aziridines **IIIa** and **IIIb** contained, respectively, a singlet from the aziridine ring proton and one set of signals from C^2 and C^3, indicating that these compounds exist as a single isomer. According to the X-ray diffraction data, the aryl groups in positions *2* and *3* of the aziridine ring in molecule **IIIb** are arranged *trans*.

The NOESY spectrum of enamide **IV** showed the absence of dipole–dipole interaction between aromatic protons in the *p*-methoxyphenyl and phenyl rings. This fact may also be interpreted in favor of *trans* arrangement of these substituents.

We are now studying factors determining the direction of transformations of *N*-(1-aryl-2,2-dihalo-2-phenylethyl)arenesulfonamides by the action of bases and the structure of aziridines and *N*-(2-halovinyl) amides thus formed.

2-Chloro-2-phenyl-1-phenylsulfonyl-3-(4-tolyl)-aziridine (IIIa). A mixture of 2.10 g (0.005 mol) of amide **Ia**, 0.80 g (0.02 mol) of NaOH, and 10 ml of DMF was stirred at 5–10°C for 3–5 min (until the mixture turned red–brown). The mixture was then diluted with 5 ml of cold water and neutralized with

Scheme 1.



I–**III**, X = H (**a**), Cl (**b**); **I**, Ar = 4-MeC_6H_4; **II**, Ar = 4-$MeOC_6H_4$.

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5% hydrochloric acid. The precipitate was separated by decanting, washed with water, and recrystallized from carbon tetrachloride. Yield 0.48 g (25%), mp 121–123°C. IR spectrum, ν, cm^{-1}: 1160, 1330 (SO_2); 1580 (C=C_{arom}); 2910 (C−H_{aliph}); 3020–3090 (C−H_{arom}). ^1H NMR spectrum ($CDCl_3$), δ, ppm: 2.27 s (3H, Me), 4.75 s (1H, 3-H), 7.11 and 7.39 (4H, *AA′BB′* system, 4-tolyl), 7.24–7.77 m (10H, Ph). ^{13}C NMR spectrum ($CDCl_3$), δ_C, ppm: 21.17 (Me), 51.15 (C^3), 72.51 (C^2), 127.30–139.05 (C_{arom}). Found, %: C 65.58; H 4.65; Cl 9.01; N 3.72; S 8.40. $C_{21}H_{18}ClNO_2S$. Calculated, %: C 65.70; H 4.73; Cl 9.24; N 3.65; S 8.35.

2-Chloro-1-(4-chlorophenylsulfonyl)-2-phenyl-3-(4-tolyl)aziridine (IIIb). A mixture of 2.21 g (0.005 mol) of amide **Ib**, 0.80 g (0.02 mol) of NaOH, and 20 ml of acetonitrile was stirred for 15–20 min. The precipitate was filtered off, the filtrate was evaporated, and the solid residue was recrystallized from carbon tetrachloride. Yield 1.22 g (60%), mp 125–128°C. IR spectrum, ν, cm^{-1}: 1160, 1330 (SO_2); 1590 (C=C_{arom}); 2910 (C−H_{aliph}), 3010–3080 (C−H_{arom}). ^1H NMR spectrum ($CDCl_3$), δ, ppm: 2.33 s (3H, Me), 4.64 s (1H, 3-H), 7.13 and 7.40 (4H, *AA′BB′* system, 4-tolyl), 7.41 and 7.71 (4H, *AA′BB′* system, 4-ClC_6H_4), 7.38–7.73 m (5H, Ph). ^{13}C NMR spectrum ($CDCl_3$), δ_C, ppm: 21.34 (Me), 51.12 (C^3), 72.06 (C^2), 127.63–140.50 (C_{arom}). Found, %: C 60.12; H 4.03; Cl 17.09; N 3.51; S 9.83. $C_{21}H_{17}Cl_2NO_2S$. Calculated, %: C 60.29; H 4.10; Cl 16.95; N 3.35; S 7.66.

2-Chloro-1-(4-chlorophenylsulfonylamino)-1-(4-methoxyphenyl)-2-phenylethene (IV). A mixture of 2.35 g (0.005 mol) of amide **II**, 0.80 g (0.02 mol) of NaOH, and 10 ml of DMF was stirred for 10 min. The mixture was then diluted with 10 ml of cold water and neutralized with 5% hydrochloric acid, and the precipitate was filtered off, washed with water, dried, and recrystallized from chloroform–acetone (10 : 1). Yield 1.17 g (54%), mp 131–133°C. IR spectrum, ν, cm^{-1}: 1155, 1330 (SO_2); 1570 (C=C_{arom}); 1600 (C=C); 2920–2960 (C−H_{aliph}); 3030–3090 (C−H_{arom}). ^1H NMR spectrum (DMSO-d_6), δ, ppm: 3.70 s (3H, Me), 6.60 and 6.98 (4H, *AA′BB′* system, 4-$MeOC_6H_4$), 7.00 m (4H, *o*-H, *m*-H, Ph), 7.10 m (1H, *p*-H, Ph), 7.37 and 7.53 (4H, *AA′BB′* system, 4-ClC_6H_4), 9.18 s (1H, NH). ^{13}C NMR spectrum (DMSO-d_6), δ_C, ppm: 55.14 (Me), 113.66, 159.06, 131.04 (OC_6H_4); 127.73, 127.97, 130.15, 135.44 (Ph); 128.38, 129.00, 131.82, 140.03 ($ClC_6H_4SO_2$); 126.71 (=CCl); 137.41 (=CNH). Found, %: C 57.95; H 3.88; Cl 16.48; N 3.34; S 7.51. $C_{21}H_{17}Cl_2NO_3S$. Calculated, %: C 58.07; H 3.95; Cl 16.33; N 3.22; S 7.38.

The NMR spectra were recorded on a Bruker DPX-400 spectrometer using HMDS as internal reference. The IR spectra were measured on a Specord 75IR instrument in KBr.

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