LETTERS TO THE EDITOR

[1, 3]-SIGMATROPIC REARRANGEMENT OF 4-ARYLSULFONYL-3-DIPHENYLMETHOXY-2,5-DIHYDRO-2-FURANONES

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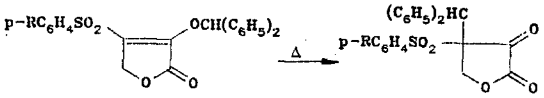
We have established that when 4-arylsulfonyl-3-diphenylmethoxy-2,5-dihydro-2-furanones Ia,b are maintained at 170-175°C for 20-30 min, they undergo rearrangement to 4-arylsulfonyl-4-diphenylmethyltetrahydrofuran-2,3-diones IIa,b in quantitative yields.



Ia,b IIa,b

I,II a R=H; b R=Br

The IR spectrum of Ib contains absorption bands at 1780 (C=O), 1655 (C=C), and 1330 and 1155 cm^{-1} (SO$_2$). In addition to a multiplet of aromatic protons, a singlet of protons of a methylene group in the 5 position at 4.81 ppm is present in the PMR spectrum. The absorption band due to stretching vibrations of a double bond vanishes in the IR spectrum of rearrangement product IIb, and the absorption band of a lactone carbonyl group is shifted to 1800 cm^{-1} this is explained by an increase in the strain of the furan ring. A singlet of the methylidyne proton of the diphenylmethyl radical at 4.71 ppm and doublets of two coupling protons at 5.78 and 5.41 ppm (J = 12 Hz), which belong to a methylene group adjacent to a chiral center, appear in the PMR spectrum of IIb.

Similar changes in the IR and PMR spectra are also observed for IIa.

The formation of C-alkylation products IIa,b evidently proceeds via a mechanism involving a superficial [1,3]-sigmatropic rearrangement. The quantitative yields of furandiones IIa,b, despite the relatively severe reaction conditions, constitute evidence in favor of this.

4-Phenylsulfonyl-4-diphenylmethyltetrahydrofuran-2,3-dione (IIa). This compound, with mp 181-182°C (dec., from butanol), was obtained by heating Ia without a solvent at 170-175°C for 30 min.

Compound IIb. This compound, with mp 187-188°C (dec., from butanol), was similarly obtained by heating Ib at 170-175°C for 20 min.

The results of elementary analysis of the compounds obtained were in agreement with the calculated values.

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