Stereospecific Reaction of Olefins with Sulphur Trioxide—Dioxan

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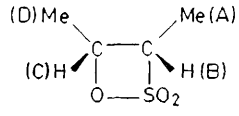
Summary The reaction of *cis*- and *trans*-but-2-ene with sulphur trioxide–dioxan proceeds stereospecifically yielding *cis*- and *trans*-2,3-butanesultone, respectively, as initial sulphonation products.

SULPHONATION of olefins with sulphur trioxide has been extensively investigated,[1] but no stereochemical study on the reaction has been reported. We now report the stereochemistry of the initial products of the sulphonation reaction between *cis*- or *trans*-but-2-ene and sulphur trioxide–dioxan.

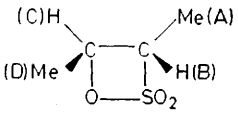
An equimolar amount of sulphur trioxide–dioxan (1 : 1) was added to *cis*- or *trans*-but-2-ene in chloroform to give the sultones (**1**) and (**2**); (**1**) δ 1·5(q), 4·7—5·1(m), J_{AB} 7·9, J_{BC} 8·0, J_{CD} 6·0 Hz; (**2**) δ 1·5(q), 4·2—4·6(m), J_{AB} 6·8, J_{BC} 5·4, J_{CD} 6·8 Hz.

These results indicate that the butane-2,3-sultones were produced stereospecifically from the corresponding but-2-ene isomers.†

Similarly, sulphonation of *cis*- and *trans*-pent-2-ene with sulphur trioxide–dioxan gave the corresponding 2,3-pentanesultones.



(1)



(2)

Addition of an equimolar amount of sulphur trioxide alone to *cis*- or *trans*-but-2-ene in chloroform at 0° also resulted in stereospecific formation of *cis*- and *trans*-2,3-butanesultone.

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† Satisfactory analytical data were obtained.

[1] For leading references see, *e.g.*: F. G. Bordwell and M. L. Peterson, *J. Amer. Chem. Soc.*, 1959, **81**, 2002; I. L. Knunyants and G. A. Sokolski, *Angew. Chem. Internat. Edn.*, 1972, **11**, 583.