Electric Dipole Moments of 2-Substituted Tellurophens

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Summary The electric dipole moments of tellurophen and five 2-substituted derivatives are reported; the mesomeric moment of tellurophen is intermediate between those of furan and selenophen.

We report here the electric dipole moment of tellurophen and some of its derivatives recently synthesized.[1] Results of the measurements, carried out at 25° in benzene, are given in the Table.

Table. *Dipole moments of 2-substituted tellurophens*

Substituent:	H	CHO	COMe	CO_2Me	Me	CH_2OH
μ (Debye units):	0·46	3·18	2·97	1·95	0·64	1·75

The electric dipole moment of tetrahydrotellurophen (benzene; 25°) (1·63 D) is lower than those of its congeners (tetrahydrofuran[2] 1·75 D, tetrahydrothiophen[2] 1·89 D, tetrahydroselenophen[2] 1·81 D).

Dipole moment analysis of appropriate derivatives of furan,[3] thiophen,[3] and selenophen[4] clearly shows that the dipole moments of the parent heterocycles (0·72,[2] 0·54[5], and 0·52 D,[4] respectively) are all directed from the ring towards the heteroatom. Reactivity data for furan and thiophen,[3] and the orientational influence of these dipolar solutes on benzene and hexafluorobenzene, as reflected by n.m.r. chemical shift measurements,[6] indicate that the furan and thiophen moments are directed from the ring to the heteroatom. It may be safely assumed that the same sign holds for the dipole moment of tellurophen.[7]

By comparing the dipole moment of unsubstituted heteroaromatic compound with that of the corresponding tetrahydro-derivative it is possible to calculate the mesomeric moment. The calculated values for furan, thiophen, selenophen, and tellurophen (1·03, 1·35, 1·29, and 1·17 D) suggest that tellurophen is more like furan in aromatic character than thiophen, in agreement with n.m.r.[8] and u.v.[1] spectroscopic data.

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