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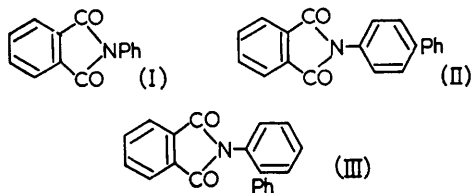
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Ionization and Dissociation of some Aromatic Imides under Electron Impact

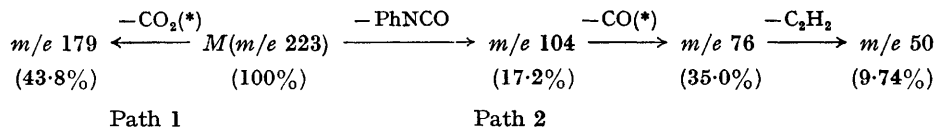
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A RECENT publication¹ on the electron-impact behaviour of *N*-methylphthalimide prompts us to report our findings on the mass spectra (MS2-H) of *N*-phenylphthalimide (I), 4-phthalimidobiphenyl (II), and 2-phthalimidobiphenyl (III). These compounds give abundant molecular ions, and, with the exception of the last compound give rise to intense $M - \text{CO}_2$ peaks.



The 70 ev mass spectrum of (I) provides evidence for the occurrence of two principal fragmentation paths,[†]



The difference between the ionization potential of *N*-phenylphthalimide (8.8 ev) and the appearance

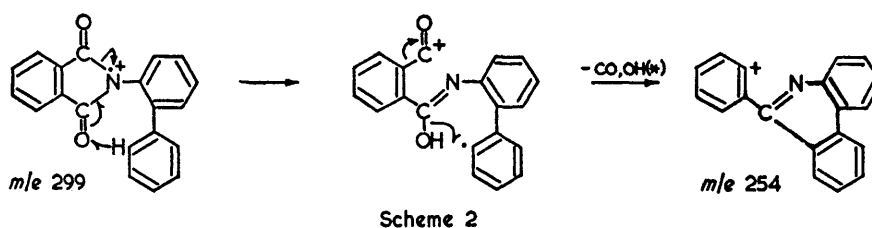
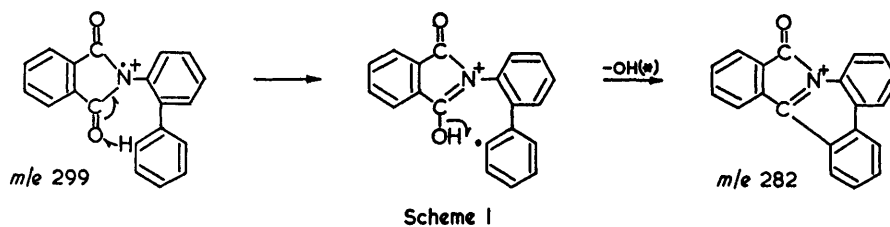
potential of the fragment ion at m/e 179 (11.0 ev) represents an activation energy of 2.2 ev for the loss of CO_2 from the molecular ion.

The mass spectra of (II) and (III) show some sharp differences and partial spectra (peaks below m/e 254 are not shown) are presented in the Table. The ionization potentials of (II) and (III) are 8.4 and 8.5 ev, respectively. The peak at m/e 255 in the mass spectrum of (II) largely corresponds to the loss of CO_2 from the molecular ion, and this assignment is supported by an appropriate metastable peak. The peaks at m/e 282 and 254 in the mass spectrum of (III) correspond to the loss of OH, and OH,CO, respectively, from the molecular ion, these assignments are supported by two appropriate metastable peaks. It is suggested that the formation of these ions involves the migration of a hydrogen atom as in Schemes 1 and 2.

In the mass spectrum of (III) the intensity of the

peak at m/e 255 (21.5%) is largely accounted for by the isotopic contribution (21.1%) from the ion

[†] An asterisk indicates a transition supported by an appropriate metastable peak.



TABLE

Partial mass spectra at 70 ev (peaks below m/e 254 are not shown) of 4-phthalimidobiphenyl (II) and 2-phthalimidobiphenyl (III).

m/e	Relative intensity (%)	
	(II)	(III)
299	100.0	89.6
282		50.5
270		31.6
255	20.8	21.5
254	12.8	100.0

at m/e 254, this shows that the loss of CO_2 from (III) is not an important fragmentation process.

Mass spectra of (I), (II), and (III) obtained at 10–15 ev showed that the loss of CO_2 is the preferred fragmentation process for (I) and (II) at low energies, and that the favoured low energy process for (III) involves the formation of the ion at m/e 254; the appearance potential of this ion is 9.8 ev.

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¹R. A. W. Johnstone, B. J. Millard, and D. S. Millington, *Chem. Comm.*, 1966, 600.