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THE NEGATIVE ION MASS SPECTRA OF ORGANIC COMPOUNDS OF THE GROUP IV-B ELEMENTS

R.G.Kostyanovsky

Institute of Chemical Physics, Academy of Science of the USSR

Moscow, U S S R

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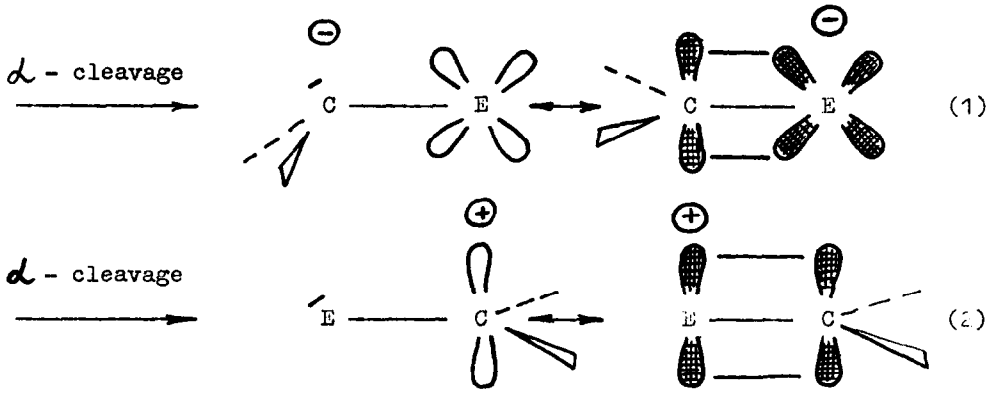
The apparently effective $p_{\pi}-d_{\pi}$ stabilization of M-1 fragments (1) in the negative ion mass spectra of tetramethylsilane and tetramethylstannane, which, in principle, is analogous to the stabilization of positive fragments by atoms with lone pairs (2), leads to the conclusion that negative ion mass spectrometry may be a useful structural method for organic compounds containing atoms with empty orbitals.



TABLE

Compounds	Ionizing energy[a] (eV)	Relative Abundance (%) of Fragments (m/e) for Si^{28} and Sn^{120}										
		$Me_3ECH_2^-$ M-1$^-$	Me_3E^- or $Me_2HECH_2^-$	Me_2ECH^- or $MeE(CH_2)_2^-$	$MeECH_2^-$	$MeECH^-$ or $E(CH_2)_2^-$	MeE^- or $HECH_2^-$	ECH_2^-	ECH^-	HC_2^-	CH_3^-	CH^-
		(87)	(73)	(71)	(57)	(56)	(43)	(42)	(41)	(25)	(15)	(13)
Me_4Si	4[b]	100	-	5	-	-	-	-	-	10	3	6.6
	7.8[b]	100	0.5	2.2	0.5	-	-	-	-	0.3	0.3	0.2
	30	100[c]	-	20	11	2.7	3.3	12	8.7	11	1.3	11
	56	10	-	1.5	1.3	0.8	2.8	7.5	16.8	100	1.8	11.3
		(179)	(165)	(163)	(149)	(148)	(135)	(134)	(133)	(25)	(15)	(13)
Me_4Sn	8[b]	100	8.5	-	64	-	4.4	-	-	-	-	-
	30	20.6[c]	100	-	51	16	20	-	-	17.7	7.4	7

[a] Energy distribution of electrons is 0.4 eV width at half-height with ionizing current of 10 μa.

[b] Resonance maxima of M-1$^-$ ions.

[c] Comparison of these figures brings out the greater ability of Si in comparison with Sn to partake in $p_{\pi}-d_{\pi}$ interaction.

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