*Metal Ketyls of Benzophenone Derivatives. I**

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(Received June 28, 1962)

The metal ketyls of benzophenone (I), *p*-methylbenzophenone (II), *p*,*p*'-dimethylbenzophenone (III), *p*-*tert*-butylbenzophenone (IV), *p*,*p*'-di-*tert*-butylbenzophenone (V), and dimesityl ketone (VI) were studied by electron spin resonance spectroscopy**. Metalic potassium was used as the alkali metal, and tetrahydrofuran as the solvent. A hyperfine structure was obtained for each spectrum of these ketyls (Fig. 1 (I)—Fig. 6 (VI)).

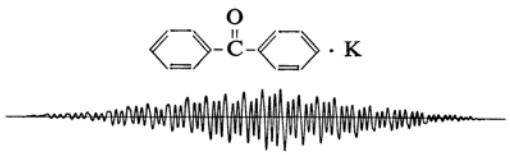


Fig. 1

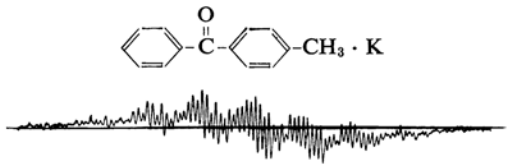


Fig. 2

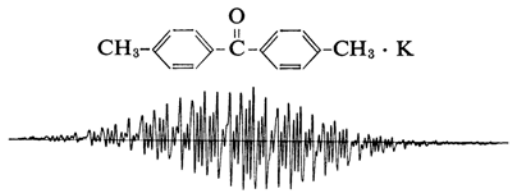


Fig. 3

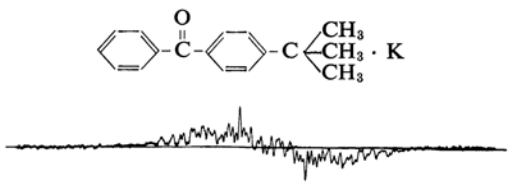


Fig. 4

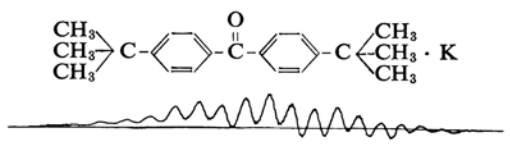


Fig. 5

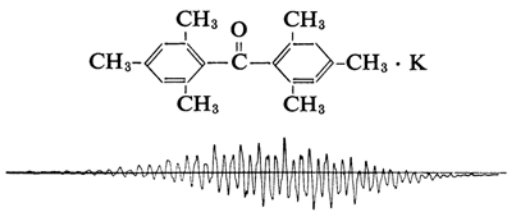
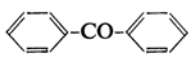
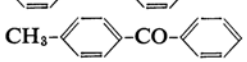
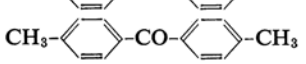
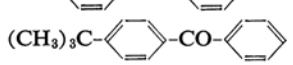
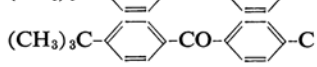
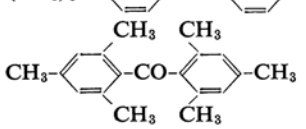


Fig. 6

TABLE I. OVERALL PROTON HYPERFINE SPLITTING OF SPECTRA

Benzophenone derivatives		Number of hydrogen atoms				Factor F	Overall splitting S, gauss	S/F
		o	*m*	*p*	α			
	(I)	4	4	2	0	16	24.5	1.54
	(II)	4	4	1	3	17	26.8	1.58
	(III)	4	4	0	6	18	29.1	1.60
	(IV)	4	4	1	0	14	22.2	1.58
	(V)	4	4	0	0	12	19.2	1.58
	(VI)	0	4	0	18	22	33.7	1.54

* The present work was presented at the 15th Annual Meeting of the Chemical Society of Japan, Kyoto, April, 1962.

** A spectrometer, 3B-type. Japan Electron Optics Laboratory Co., Ltd. (Tokyo, Japan) was used.

The present authors found that the molecular symmetry of ketyls has a considerable influence on the total shape of the spectra. Although there has as yet been no explanation for these experimental facts, the present writers are rather inclined to consider that the cause of the poor resolution of the spectra of the ketyls (II, IV) which have different phenyl groups seems to be due to the different contributions of the two phenyl groups to the free electron.

We have not yet been able to assign their hyperfine structures, but there seems to be a relation between the number of hydrogen atoms and the overall proton hyperfine splitting of the spectra, as can be seen from Table I.

Factor F was calculated assuming that the weight of the ortho- and para-hydrogen atoms was 2, and that of meta- and α-hydrogen atoms, 1. For example, in the case of compound I, $F=4\times2+4\times1+2\times2=16$.

The authors wish to thank the Ministry of Education for its grant.

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