DIVISION OF ANALYTICAL CHEMISTRY

COMMISSION ON MICROCHEMICAL TECHNIQUES*

RECOMMENDED TEST SUBSTANCES FOR THE MICRODETERMINATION OF OXYGEN IN ORGANIC COMPOUNDS

A number of compounds are recommended for use as reference substances for the microdetermination of oxygen in organic substances. All of these substances, or a proper selection from the list, may be used to determine the universal applicability of a given method, either already described or one which might be developed in the future.

The compounds selected are stable over long periods of time and are non-hygroscopic (any exceptions to the latter generalization are so noted). The substances are either commercially available in a sufficiently pure state to be used for test purposes based on the accuracy of present-day methods, or may be purified or prepared by conventional laboratory means to meet these standards.

The compounds selected include the following:

(1) compounds for the determination of the blank value and those which have extreme values (high as well as low) for oxygen content;
(2) compounds representing a variety of structural types;
(3) compounds containing elements which may cause interferences in the oxygen determination.

These recommendations may be changed or supplemented as the need arises.

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List of substances	*Empirical formula*	*Molecular weight*	O (%)	C (%)	H (%)	N (%)	Hal (%)	S (%)	*Element* (%)
Blank (C, H, N)									
Anthracene	$C_{14}H_{10}$	178·234		94·34	5·66				
Naphthalene	$C_{10}H_8$	128·174		93·71	6·29				
Diphenylamine	$C_{12}H_{11}N$	169·227		85·17	6·55	8·28			
C, H(O)									
Benzoic acid	$C_7H_6O_2$	122·123	26·20	68·85	4·95				
Cholesterol	$C_{27}H_{46}O$	386·664	4·14	83·87	11·99				
d-Glucose (dextrose)	$C_6H_{12}O_6$	180·156	53·28	40·00	6·71				
N(C, H, O)									
Acetanilide	C_8H_9ON	135·166	11·84	71·09	6·71	10·36			
2,4-Dinitrophenylhydrazine	$C_6H_6O_4N_4$	198·138	32·30	36·37	3·05	28·28			
F(C, H, O . . .)									
p-Fluorobenzoic acid	$C_7H_5O_2F$	140·113	22·84	60·01	3·60		13·56 F		
Trifluoroacetanilide	$C_8H_6ONF_3$	189·136	8·46	50·80	3·20	7·41	30·13 F		
Br (C, H, O . . .)									
p-Bromoacetanilide	C_8H_8ONBr	214·067	7·47	44·89	3·77	6·54	37·33 Br		
Cl (C, H, O . . .)									
Chloroacetamide	C_2H_4ONCl	93·513	17·11	25·69	4·31	14·98	37·91 Cl		
I(C, H, O . . .)									
o-Iodobenzoic acid	$C_7H_5O_2I$	248·019	12·90	33·90	2·03		51·17 I		

S(C, H, O . . .)									
Sulphanilamide	$C_6H_8O_2N_2S$	172·206	18·58	41·85	4·68	16·27		18·62	
Sulphonal	$C_7H_{16}O_4S_2$	228·329	28·03	36·82	7·06			28·09	
P, As(C, H, O . . .)									
o-Arsanilic acid	$C_6H_8O_3N\,As$	217·056	22·11	33·20	3·72	6·45			34·52 As
5-Chloro-4-hydroxy-3-methoxybenzyl isothiourea phosphate*	$C_9H_{14}O_6N_2Cl\,S\,P$	344·710	27·85	31·36	4·09	8·13	10·28 Cl	9·30	8·99 P
Me(C, H, O . . .)									
Calcium oxalate	C_2O_4Ca	128·098	49·96	18·75					31·29 Ca
Phenylmercuric acetate	$C_8H_8O_2Hg$	336·740	9·50	28·53	2·39				59·57 Hg
Sodium oxalate	$C_2O_4Na_2$	133·998	47·76	17·93					34·31 Na

* W. H. Smith. *Anal. Chem.* **30**, 149 (1958).

Notes

For the calculation of molecular weights and percentages, the atomic weights used are those proposed by the Commission on Atomic Weights of the I.U.P.A.C., 1961.

The percentage figures are given to the second decimal. Where the third decimal is less than 0·005, the last figure has been disregarded. Where the last figure has been rounded off, it has been underlined (0·375 = 0·38).

All of the compounds have been included in the three previous lists of recommended test substances, "Recommended Test Substances for the Microdetermination of Carbon and Hydrogen", *Pure Appl. Chem.* **1**, 143 (1960), "Recommended Test Substances for the Microdetermination of Nitrogen in Organic Compounds", *Pure Appl. Chem.* **3**, 513 (1961), and "Recommended Test Substances for the Microdetermination of Halogens and Sulphur in Organic Compounds", *Pure Appl. Chem.* **5**, 759 (1962).