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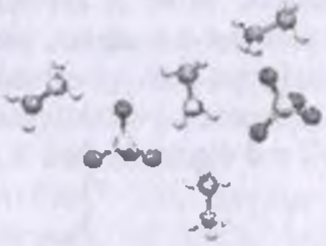
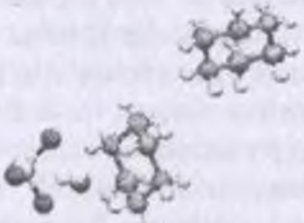
THE PRODUCTS OF SO_2 INTERACTION WITH AQUEOUS SOLUTIONS OF METHYLAMINE, BENZYLAMINES, 1,2-DIAMINES AND MORPHOLINE

Ruslan E. Khoma[1,2], Vladimir O. Gelmboldt[3], Alim A. Ennan[2],
Vyacheslav N. Baumer[4,5], Aleksander V. Mazepa[6], Tatiana V. Koksharova[1]

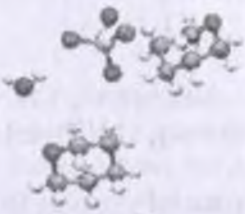
[1]Mechnikov Odessa National University, Dvoryankaya St., 2, Odessa, 65082, Ukraine
[2]Physico-Chemical Institute of Environment and Human' Protection,
Preobrazhenskaya St., 3, Odessa, Ukraine
[3]Odessa National Medical University, Valikhovskiy lane, 2, Odessa, Ukraine
[4]Institute of Single Crystals, National Academy of Sciences of Ukraine, Kharkov, Ukraine
[5]Karazin Kharkov National University, Kharkov, Ukraine
[6]Bogatskii Physicochemical Institute, National Academy of Sciences of Ukraine, Odessa, Ukraine
E-mail: rek@onu.edu.ua


I


II


III


IV


V

The new method of preparation of sulphur oxoanions "onium" salts via interaction in the SO_2–L–H_2O–O_2 systems (L is methylamine, benzylamines, 1,2-diamines, and morpholine) has been developed. "Onium" sulfates have been obtained from methylamine, benzylamine, α-phenylethylamine, N,N-dimethylbenzylamine, dibenzylamine, 1,2-ethylenediamine, morpholine, N,N,N',N'-tetramethylethylenediamine; sulphites monohydrates – from piperazine and N-(hydroxyethyl)ethylenediamine; dithionate – from piperazine and N,N,N',N'-tetramethylethylenediamine. The compounds were characterized by elemental analysis, X-ray diffraction, IR, Raman spectroscopy, mass spectrometry, and differential thermal analysis.

The crystal structures of new salts methylammonium sulphate (I), α-phenylethylammonium sulfate (II), piperazinium sulphite monohydrate (III) and dithionate (IV), morpholinium sulphate monohydrate (V) have been determined by X-ray diffraction. The structures I – V are stabilized by numerous H-bonds NH···O, OH···O.

New examples of stabilization of sulfate anion in the form of alkylammonium salts prepared in the SO_2–L–H_2O–O_2 systems (L were amines) have been demonstrated. The formation of "onium" sulfates is the result of interaction following the formal scheme:

$2SO_2 + 4R_nNH_{3-n} + 2H_2O + O_2 \rightarrow 2(R_nNH_{4-n})_2SO_4$.

The fact the structurally studied organic sulfites are exhausted by tetramethylguanidinium hydrosulfite (I) [1] and aminoguanidinium sulfite monohydrate [2], N-(2-hydroxyethyl)ethylenediammonium sulfite monohydrate [3] seems to be due to the ease for the sulfites to convert into dithionates and sulfates as a result of "autooxidation" [4].

1. D.J. Heldebrant, C.R. Yonker, P.G. Jessop, L. Phan, Chem.-Eur. J. 15, 7619 (2009).
2. R.E. Khoma, V.O. Gelmboldt, V.N. Baumer, et al., Russ. J. Inorg. Chem. 58, 843 (2013).
3. R.E. Khoma, V.O. Gelmboldt, O.V. Shishkin, et al., Russ. J. Inorg. Chem. 59, 541 (2014).
4. R.E. Khoma, A.A. Ennan, V.O. Gelmboldt, et al., Russ. J. Gen. Chem. 84, 637 (2014).