

In view of the present considerations, it is probably not necessary to assume (as have Balmbra *et al.*) that the micelle size changes with concentration, although this cannot be decided unequivocally. For example, if their results are interpreted along the lines we have suggested, their data for the hexaethylene glycol ether of decanol give an approximate apparent aggregation number of 40 at a concentration of 0.004 g/ml., while equation 3a yields an apparent aggregation number of 63. In view of certain of the approximations involved, this is probably good agreement, although, as has already been indicated, some dependence of micellar size on concentration cannot be disregarded.

I thank Dr. J. F. Kuong for carrying out the computer tabulations involved in this work.

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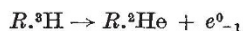
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- ¹ Debye, P., and Coll, J., *J. Colloid Sci.*, **17**, 220 (1962).
² Kitihara, A., *Bull. Chem. Soc. Japan*, **31**, 288 (1959).
³ Sirianni, A. F., and Gingras, B. A., *Can. J. Chem.*, **39**, 331 (1961); Sirianni, A. F., and Cowie, J. M. G., *Can. J. Chem.*, **40**, 957 (1962); Sirianni, A. F., and Coleman, R. D., *Can. J. Chem.*, **42**, 682 (1964).
⁴ Debye, P., and Prins, W., *J. Colloid Sci.*, **13**, 86 (1958).
⁵ Balmbra, R. R., Clunie, J. S., Corkill, J. M., and Goodman, J. F., *Trans. Faraday Soc.*, **60**, 979 (1964).

β -Decay in Preparative Noble Gas Chemistry

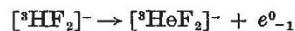
WITH regard to projected research by Miller, Spratley and Pimentel on the synthesis of helium compounds, for example, and in particular the ingenious experiment based on the β -decay of tritiated inorganic fluorides¹, it is interesting to recall mass spectrometer surveys of organic compounds labelled with β -emitting components²⁻⁵.

For any tritiated compound, the following reaction might be proposed:



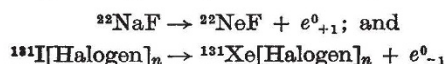
However, in the case of mono-tritiated paraffins, the carbon-helium bond is ruptured during β -recoil, and of the many and varied species detected in a mass spectrometer containing CH_3^3H , the expected one, $[\text{CH}_3^3\text{He}]^+$, occurs only to the extent of about 0.06 per cent³. Gaseous $\text{C}_2\text{H}_5^3\text{H}$ presents a very similar mass spectrometer pattern, with a scarcity of the peak attributable to the $[\text{C}_2\text{H}_5^3\text{He}]^+$ ions³. Also, $[\text{CH}_3^{82}\text{Kr}]^+$ ions are found in only about 0.4 per cent of the decays from $\text{CH}_3^{82}\text{Br}$ (ref. 4). On the other hand, in 70 per cent of the β -decays in gaseous $\text{CH}_3^{131}\text{I}$ samples, the $[\text{CH}_3^{131}\text{Xe}]^+$ ions remained intact, compared with a 34 per cent survival of $[\text{CH}_3^{130}\text{Xe}]^+$ ions for the correspondingly more energetic β -decay of ^{130}I in $\text{CH}_3^{130}\text{I}$ vapour⁶. These data illustrate the general principle that the abundance of an intact parent carbon-noble gas ion depends on the carbon-noble gas bond strength, as well as the recoil energy imparted to such bonds from β -decay.

Unfortunately, from a preparative point of view, these carbon-noble gas species cannot be isolated for a more casual laboratory examination. Despite these drawbacks, it is feasible that tritium decay in solid fluoride samples (ref. 1),



will yield material of suitable stability.

To date, no authentic chemistry has been established for helium, neon or argon; nor have any chlorides or bromides of krypton or xenon been synthesized, despite vigorous attempts to do so⁷. However, in the light of the above facts, it should be possible to extend the range of noble gas compounds, and reactions, such as:



may provide a basis for realizing a neon fluoride as well as chlorides and bromides of xenon.

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- ¹ Miller, A. R., Spratley, R. D., and Pimentel, G. C., *Science*, **143**, 674 (1964).
² Snell, A. H., and Pleasonton, F., *J. Phys. Chem.*, **62**, 1377 (1958).
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⁶ Carlson, T. A., and White, R. M., *J. Chem. Phys.*, **38**, 2075 (1963).
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Crystal Structure of Strontium Diborate

$\text{SrO} \cdot 2\text{B}_2\text{O}_3$ crystallizes below 1,000° C from a melt of the same composition. The crystals belong to the space group $Fm\bar{m}2_1$ and have unit cell dimensions $a = 10.711 \pm 0.005$ Å, $b = 4.427 \pm 0.002$ Å, $c = 4.235 \pm 0.002$ Å. The calculated density with 2 formula units in the cell is 4.02 g/cm³.

The structure has been solved with a three-dimensional Fourier synthesis and refined by the method of least squares. A reliability index of 12.6 per cent was obtained for data from 189 three-dimensional reciprocal lattice points. The following parameters were obtained:

Atom	x/a	y/b	z/c
Sr	0.000	0.289	0.000
O ₁	0.000	0.728	0.454
O ₂	0.359	0.857	0.064
O ₃	0.221	0.631	0.335
O ₄	0.365	0.226	0.335
B ₁	0.379	0.174	0.976
B ₂	0.246	0.671	0.963

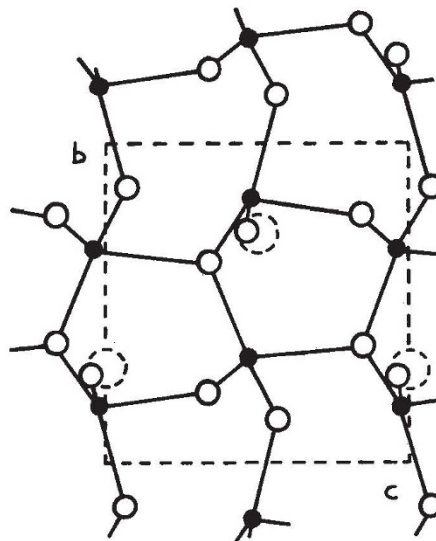


Fig. 1. Projection along the a -axis. Filled circles represent boron, open circles represent oxygen, large dashed circles represent strontium. The unit cell is indicated with dashed lines. Oxygens closest to strontium in projection form bridges with layers below or above, which are mirror images of the layer shown

A projection of the structure is shown in Fig. 1. Essentially the structure may be described as a three-dimensional network of BO_4 —tetrahedra with an average B—O bond-length of 1.49 Å. The network shown in Fig. 1 is bonded to its own mirror image (exactly above or below) through the atom O₁. This atom is seen close to strontium (dashed circle) in the projection. A noteworthy feature of the structure is the occurrence of an oxygen atom (O₃) co-ordinated by three borons.

A detailed report about this structure determination will be published elsewhere.

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