The formula for $\bar{g}$ for an atom having the position of its center distributed with uniform probability along a circular arc is

$$\bar{g} = f \exp{(2\pi i \mathbf{h}.\mathbf{k})} \left[J_0(a) + \{A(a, \theta_2) - A(a, \theta_1)\}/(\theta_2 - \theta_1) \right],$$

where $A(a, \theta) = \sum_{m=1}^{\infty} (2/m) i^m J_m(a) \sin m\theta.$

The function $A(a, \theta)$ is periodic in θ with the period 2π. In addition, it has the properties:

$$A(a, \pi + \theta) = A^*(a, \theta); \quad A(a, \pi - \theta) = -A^*(a, \theta);$$
$$A(a, -\theta) = -A(a, \theta); \quad A(a, n\pi) = 0; \quad A(0, \theta) = 0.$$

Hence it is necessary only to tabulate values of the A function for the range, $\theta = 0$ to $\theta = \frac{1}{2}\pi$. A table of values of $A(a, \theta)$ is given in Table 1.

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La structure cristalline de LaSi₂. Par F. BERTAUT et P. BLUM, Institut Fourier, Place du Doyen Gosse, Grenoble Isère, France

Zachariasen (1949) a montré que les siliciures d'uranium, de neptunium, de plutonium et de cérium sont isomorphes de $ThSi_2$ dont la structure a été établie par Brauer & Mitius (1942). Comme le thorium et les terres rares, dont le cérium est un représentant, sont isomorphes dans leurs borures, il est à supposer que toute la série des terres rares est isomorphe dans ses siliciures. Ce point a été vérifié sur $LaSi_2$ qui a donc pour groupe spatial $I4/amd$ avec les positions d'atomes suivantes:

$$(0, 0, 0), (\tfrac{1}{2}, \tfrac{1}{2}, \tfrac{1}{2}) + 4\,\text{La en } (0, 0, 0), (0, \tfrac{1}{2}, \tfrac{1}{4}),$$
$$8\,\text{Si en } (0, 0, 0 \pm z), (0, \tfrac{1}{2}, \tfrac{1}{4} \pm z),$$

où $z = 0{,}417 \pm 0{,}01.$

Les paramètres sont $a = 4{,}37_4$; $c = 13{,}56_5$ A.

La densité calculée est $d = 4{,}95$ g.cm.$^{-3}$.

Nous remercions Monsieur le professeur Dodero, qui le premier a réussi à préparer $LaSi_2$, d'avoir bien voulu nous confier un échantillon de cette substance.

Références

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A preliminary examination of the crystal structure of dimethyltelluronium diiodide, Te(CH₃)₂I₂. By ERNESTO E. GALLONI and J. PUGLIESE, Facultad de Ciencias Exactas Físicas y Naturales, Universidad de Buenos Aires, Argentina

This substance was first prepared by Vernon (1920a, b, 1921), who obtained two forms corresponding to the formula deduced from the chemical analysis. Vernon postulated an isomerism, naming the two forms α- and β-dimethyltelluronium diiodide. Drew (1929), however, proved the non-existence of isomerism among these two forms, finding by means of chemical investigations that the β form is not isomeric with the α form, but is a complex substance having the same empirical formula; and he established for the β form the formula

$$\text{Te(CH}_3)_3\text{I} . \text{Te(CH}_3)\text{I}_3.$$
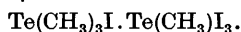
Vernon described the crystals of both forms, giving for the α form the following constants determined by goniometric measurement:—crystal system: monoclinic; class: holohedral; axial angle: $72° 21'$; axial ratio:

$$a:b:c = 0{\cdot}5578 : 1 : 0{\cdot}4310.$$

We have taken rotation patterns about the three axes and Weissenberg patterns about the b and c axes. The dimensions of the unit cell so determined were:

$$a = 12{\cdot}26 \pm 0{\cdot}03, \quad b = 21{\cdot}89 \pm 0{\cdot}04,$$
$$c = 9{\cdot}46 \pm 0{\cdot}04 \text{ A.}; \quad \beta = 72° 24' \pm 10'.$$

These data give the axial ratios

$$a:b:c = 0{\cdot}561 \pm 0{\cdot}03 : 1 : 0{\cdot}433 \pm 0{\cdot}03,$$

in agreement with Vernon's determinations.

When the diffraction spots in the Weissenberg photographs were indexed, the following interferences were observed: hkl in all orders; $h0l$ when $h = 2n$; $0k0$ when $k = 2n$. These data are consistent with the space group $C_{2h}^5 - P2_1/a$.

The density of crystals, determined by Vernon, was $3{\cdot}34$ g.cm.$^{-3}$. From this and the unit-cell dimensions we calculated that the cell contains $11{\cdot}9 \sim 12$ molecules. No smaller cell can exist; if it did, the cell chosen could not be primitive. For atoms in general positions the space group C_{2h}^5 presents a maximum multiplicity of 4. This induced us to suppose that the 12 molecules cannot all be identical.

The probability of this statement is consistent with the investigations of Drew for the β form; this author limited his observations to the β form and accepted for the α form the straight formula determined by analysis, basing his opinion uniquely on the method of chemical preparation. It is possible, therefore, that neither the α form nor the

β form corresponds to the simple formula $Te(CH_3)_2I_2$. The demonstration of our supposition could explain the anomaly observed in the determination of the number of molecules per unit cell.

Further investigations are being carried out.

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A note on the rhombohedral modification of graphite. By G. E. BACON, *Atomic Energy Research Establishment, Harwell, Berks, England*

Jagodzinski (1949), from an examination of single crystals of graphite of rather coarse mosaic structure, has found that the proportion of rhombohedral structure is much less than the 14:80 ratio found by Lipson & Stokes (1942) from powder photographs. He finds, however, that the difference is less marked for the most disoriented blocks of the crystal mosaic and suggests that the ABC structure is more stable at low temperatures.

Further information, of interest in connexion with the above, has been obtained by the writer from powder photographs. Photographs were examined of two varieties of well-crystallized graphite, one natural and the other artificial, using cylindrical specimens prepared by grinding, sieving and extrusion in the usual way. The integrated intensity of the $10\bar{1}\tfrac{2}{3}$ line varied between 17 and 22 % of that of the $10\bar{1}1$ line, in fair agreement with Lipson & Stokes's result, which corresponds to $17\tfrac{1}{2}$ %. The artificial graphite occurred in the form of a soft flaky block, shown by transmission photographs to be practically randomly oriented, and it was possible to cut a small approximately cylindrical fragment from this for direct mounting, without powdering, in the X-ray camera. The intensity of the $10\bar{1}\tfrac{2}{3}$ reflexion was then only 4 % of the $10\bar{1}1$. The fragment was next lightly crushed and reassembled by extrusion through a capillary tube, giving an increase to 9 %. Further specimens were made after light and heavy grinding in an agate mortar giving, respectively, values of 11 and 17 %. In the case of a massive natural graphite specimen an increase from 8 to 24 % was obtained when the block was reduced to powder by sawing. Corresponding increases of intensity of the $10\bar{1}\tfrac{4}{3}$ line were observed through the series

o specimens. Inspection of the photographs also showed a small but definite broadening of the hkl reflexions on powdering which may be accounted for by a reduction in the thickness t of the crystallite subblocks (Bacon, 1950) or, equally, may be due to distortion.

A number of subsidiary measurements were made to confirm that no appreciable proportion of the variations described was due to orientation effects of the type described by Nelson & Riley (1945). Cylindrical fragments cut respectively parallel to and across the grain of the soft flaky block gave values of 4 and 5 % for the $10\bar{1}\tfrac{2}{3}$ intensity relative to $10\bar{1}1$. Specimens cut parallel and perpendicular to the extrusion direction of an extruded block made from powdered natural graphite gave values of 12 and 14 % respectively, although the preferred orientation in this block was so high that the 0004 and 0006 reflexions showed a fourfold increase of intensity in the parallel specimen.

These results would seem to support the conclusion that the proportion of ABC structure in well-crystallized graphites as formed is only a few per cent, but that it may be considerably increased by powdering.

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Notes and News

Year-Book of International Organizations

The 1950 Edition of the *Year-Book of International Organizations* will appear shortly. This work, in French and English, includes the following: (1) Structure of the Organization for European Economic Co-operation. (2) The Council of Europe. (3) The Brussels Treaty Organization of 'Western Union'. (4) The Organization of American States. (5) The United Nations. (6) The Specialized Agencies. (7) Governmental and Non-Governmental Organizations. The *Year-Book* contains also a chronological list of events during 1949, a list of

Embassies and Chambers of Commerce, and a calendar of the principal commercial manifestations.

This book, which completes the *Monthly Review* published by the Union of International Associations, is produced jointly by the Éditions de l'Annuaire des Organisations Internationales (2 Avenue Bellefontaine, Lausanne, Switzerland) and the Union of International Associations (Palais d'Egmont, Brussels, Belgium). Requests for further information or for subscription forms may be sent to either of these addresses.