Short Communications

Contributions intended for publication under this heading should be expressly so marked; they should not exceed about 500 words; they should be forwarded in the usual way to the appropriate Co-editor; they will be published as speedily as possible; and proofs will not generally be submitted to authors. Publication will be quicker if the contributions are without illustrations.

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The coefficient of thermal expansion of zirconium nitride.

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An X-ray method of determining the thermal expansion was adopted.

The zirconium nitride used was prepared by heating about 10 g. of zirconium powder, surrounded by a nitrogen atmosphere of low oxygen content, for 4 hr. at 1250° C. in an alumina boat. A chemical examination of the compound formed gave the analysis of 52·7, 47·2, and 0·05 atomic% for zirconium, nitrogen and magnesium respectively.

The zirconium nitride in powder form was enclosed in an unsealed silica capillary tube, and examined in a Unicam S. 150 high-temperature camera under a vacuum of the order of 1×10^{-4} mm. Hg. The camera furnace was fed from a supply fitted with a Claude Lyons BMVR-1725 stabilizer, and its temperature was further controlled by a regulator utilizing the resistance properties of the platinum-wound furnace itself.

The temperature of the specimen was inferred from the readings of a platinum–platinum/rhodium thermocouple consisting of a 0·7 mm. bead situated just below the specimen and having 0·005 in. leads. This thermocouple was calibrated by X-ray measurements of the interplanar spacings of platinum, using thermo-pure filings, in a silica capillary, at various temperatures. These measurements were compared with the dilatometric data for platinum of Esser & Eusterbrock (1941), which were taken as the standard.

The measured unit-cell dimensions are

$4{\cdot}5745 \pm 0{\cdot}001$ Å at 17° C.,
$4{\cdot}5865 \pm 0{\cdot}001$ Å at 445° C.,
$4{\cdot}5965 \pm 0{\cdot}001$ Å at 680° C.

These yield the following values for the coefficients of thermal expansion:

$6{\cdot}0 \pm 0{\cdot}5 \times 10^{-6}$° C.$^{-1}$, temperature range 17–445° C.;
$7{\cdot}0 \pm 0{\cdot}5 \times 10^{-6}$° C.$^{-1}$, temperature range 17–680° C.

There is no indication of a phase change over this region, and the unit-cell dimension at 17° C. was unchanged by the thermal treatment of the specimen.

The unit-cell dimension at room temperature agrees with the value of Duwez & Odell (1950) of 4·576 Å (quoted as 4·567 kX. units), in contrast to the values of 4·63 kX. units (Becker & Ebert, 1925) and 4·61 kX. units (van Arkel, 1924) reported by previous investigators.

References

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DUWEZ, P. & ODELL, F. (1950). *J. Electrochem. Soc.* **97**, 305.
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Crystallographic properties of procaine hydrochloride.

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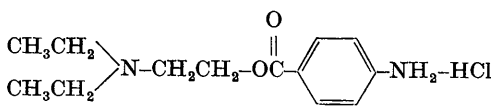
Procaine hydrochloride, used medicinally as a local anesthetic, has the chemical name 2-diethylaminoethyl-*p*-aminobenzoate hydrochloride. A mention of the optical crystallography is made by Keenan (1944). The compound is represented by the formula:



Crystallization from ethyl acetate–ethanol solution results in needles elongated parallel to *c* and showing {010}, {120} and small {100}. Crystallization from water gives plates lying on (010). The sample used for this study melted in the range 156·5–158·0° C. (Kofler hot stage). The crystal system is orthorhombic with space group D_{2h}^{15}–*Pcab* and eight molecules per cell. The observed density is 1·232 g.cm.$^{-3}$ (flotation), while the density calculated from X-ray data is 1·220 g.cm.$^{-3}$. The unit-cell dimensions are:

$$a_0 = 14{\cdot}35, \quad b_0 = 25{\cdot}04, \quad c_0 = 8{\cdot}28 \text{ Å}.$$

The optical properties are:

$\alpha = 1{\cdot}540$, $\beta = 1{\cdot}564$, $\gamma > 1{\cdot}70$ (all at 25° C., 5893 Å); $(+)2V = 37°$. The optic plane is 001, $\alpha = a$. Keenan (1944) gives $\alpha = 1{\cdot}540$, $\beta = 1{\cdot}566$, $\gamma > 1{\cdot}690$.

The powder data (Table 1) were obtained using a