

than for the cases just discussed, and the observed (small) $^{93}\text{Mo}^*$ activity from this reaction is not unexpected. It can be readily seen from the table that the (d,p) reaction is certainly not more promising than the $(n,2n)$ reaction and probably less.

So far, only reactions have been considered in which the initial nucleus had zero spin. For (p,n) and $(d,2n)$ reactions the initial ^{93}Nb nucleus has a spin of $9/2$. The resulting higher spin intermediate states which are thus obtained favour transitions to the isomeric state. For example, even if we assume s -state protons and neutrons in the (p,n) reaction, intermediate states of spin $7/2(0.20)$, $9/2(0.47)$ and $11/2(0.33)$ will be formed, with the weight of each spin shown in brackets. This shows clearly why the $^{93}\text{Mo}^*$ state is reached in these two reactions and not in the others.

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Spiral Morphology of Boron Particles

IN recent work on the ultimate analysis of decaborane¹ the permeability of palladium to hydrogen was utilized to separate the elements formed in the pyrolysis of this compound. Decaborane, contained in sealed palladium capsules, was decomposed by heating at 900°C ., leaving a solid pyrolysis residue

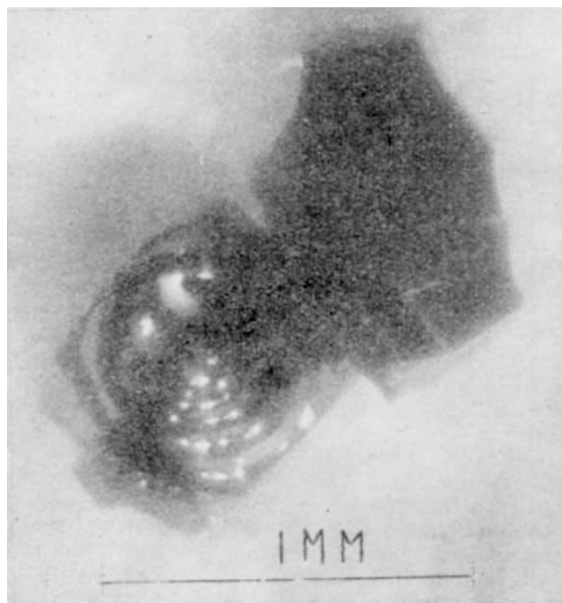


Fig. 1. Boron particles from pyrolysis of decaborane

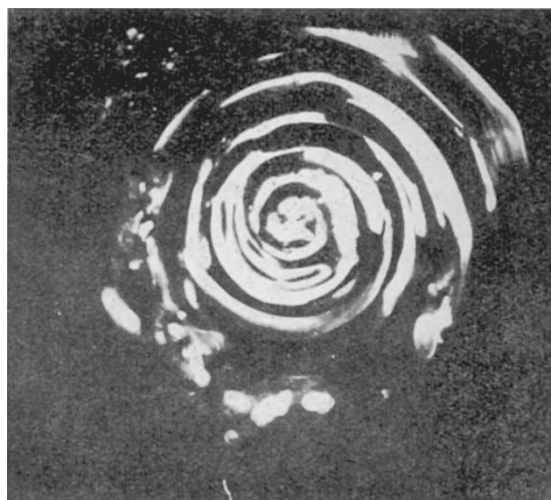


Fig. 2. Boron particle from pyrolysis of decaborane (dark-field illumination. $\times 80$)

of boron containing approximately 0.5 atom per cent palladium. The residue was in the form of hard, shiny black granules (0.5–1.0 mm.), the X-ray diffraction pattern of which consisted of three diffuse rings.

Microscopic examination disclosed that many of the particles possessed an external spiral morphology, as shown in Fig. 1. This is more clearly seen in the photomicrograph (Fig. 2) prepared by Dr. F. H. Horn, of this laboratory. The spiral lacked the sharp step heights usually observed in the spiral growth patterns of crystalline materials. It more closely resembled a rolled-up rug viewed end on.

At present we can offer no conclusive mechanism for the growth process which produced this unusual external morphology unaccompanied by any X-ray crystallinity. Pyrolysis of anthracene under the same conditions produced a non-crystalline carbon residue with no regular external structure.

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Structure of Porphyrilic Acid

PORPHYRILIC acid, a sparingly soluble acid of high melting point (approx. 298° after darkening from 270°), was isolated by Zopf¹ from the crustaceous lichens *Haematomma porphyrium* (Pers.) and *H. coccineum* (Dicks.). Both lichens contained other acids, the latter, for example, (–)usnic acid. Porphyrilic acid, for which no analyses were given, was characterized by an intense indigo-blue colour reaction with ferric chloride and a green colour with a solution of bleaching powder. On thermal decomposition, porphyrilic acid yielded a characteristic product, porphyrilin.

An acid, undoubtedly identical with porphyrilic acid, has now been isolated together with levorotatory usnic acid from a lichen material consisting essentially of *H. coccineum*. The acid is extremely sparingly soluble in most organic solvents and is conveniently purified through its cyclohexylamine salt,