keep the solution acid enough so that the reaction went in large measure to completion. As the reaction proceeded red crystals of germanium tetraiodide collected in the bottom of the flask. The tetraiodide was removed from the cold reaction mixture by filtering on a Büchner funnel and was dried in the air on a porous plate. Some unchanged germanium dioxide contaminating the tetraiodide was removed by treating the crude product with boiling carbon tetrachloride, filtering the hot solution, and crystallizing the tetraiodide from the filtrate. The yields of two separate experiments were 80 and 85% and it seems probable that stirring would increase these since the germanium tetraiodide tends to form a protective layer around the unchanged germanium dioxide.

The purified material had a melting point of 146°, the determination being made on the electric bar described by Dennis and Shelton.[4] This agrees well with the value 144° obtained by Dennis and Hance[1] using the older capillary tube method. Analyses for germanium showed that the sample was pure.

[4] Dennis and Shelton, This Journal, **52**, 3128 (1930).

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Note on Some Periodical Properties of Atomic Nuclei.—In a recent paper Latimer[1] has described an interesting model of the nucleus of an atom consisting of a number of tetrahedra. Each of them, representing an α-particle, is built of four protons located at the corners and two electrons located in the center.

Taking such tetrahedra as elements it is easy to build larger tetrahedra consisting each of 4, 10, 20, 35 and 54 elements. The numbers of protons in such nuclei will be as follows: 16, 40, 80, 140 and 216.

If we assume, now, that atomic nuclei having analogous geometrical forms must have also analogous physical properties, we must expect some periodic regularities in the system of atomic nuclei arranged according to their weight. It is possible to prove this in the following ways.

(1) Representing the number of additional nuclear electrons in a nucleus built from α-particles as a function of the atomic weight N and taking mean values for each N, we obtain a periodic curve, the periods corresponding well to the above-mentioned law (Fig. 1).[2]

(2) Representing the numbers of isotopes Q as a function of N, we obtain

[1] Wendell M. Latimer, This Journal, **53**, 981 (1931).

[2] R. A. Sonder, *Z. allgem. anorg. Chem.*, **192,** Heft 3 (1930).

also the same periodicity (Fig. 2), here are given mean values for an interval of ten values of N.[3]

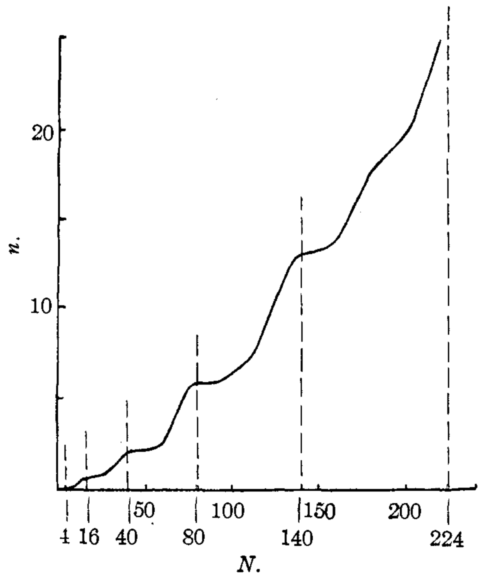

Fig. 1.—The relation between the additional electrons n and the atomic weight N.

(3) Taking the logarithms of relative numbers of elements with even and with odd numbers of electrons as a function of N, and representing the

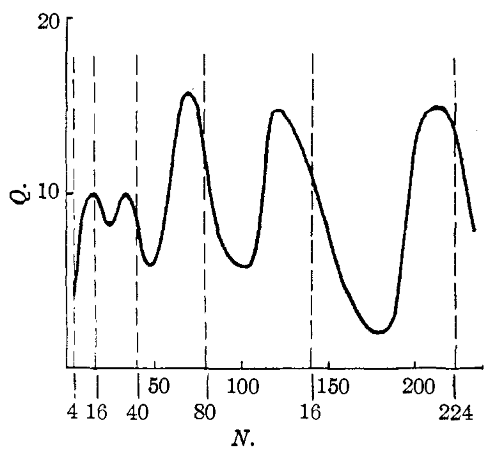

Fig. 2.—The relation between the number of isotopes Q and the atomic weight N.

[3] G. I. Pokrowski, *Naturwiss.*, **19**, 573 (1931).

differences of these values E for two neighboring elements also as a function of N, or of the atomic number Z, we obtain a curve with the same periodicity (Fig. 3).[4]

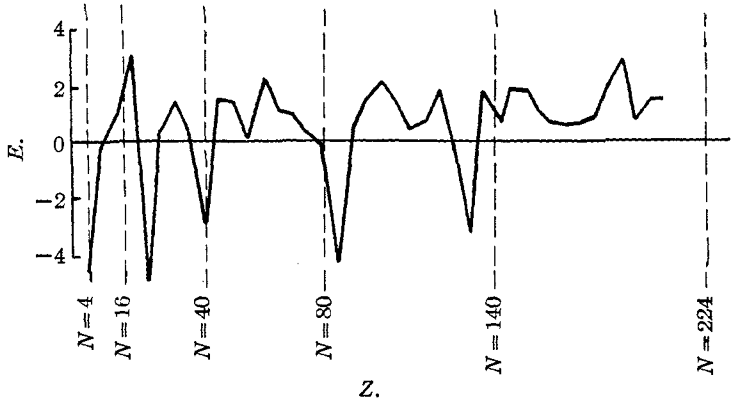

Fig. 3.—The relation between the value of E and the atomic number Z.

Nearly the same periodicity can be deduced theoretically from de Broglie's equation. This possibility will be discussed in another place.

[4] According to experimental data given by J. and W. Noddak, *Naturwiss.*, **18**, 757 (1930).

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Molecular Rotation in Solid Sodium Nitrate

It was shown by Kracek and his co-workers,[1] that the gradual transition in sodium nitrate at 275° is accompanied by an important change of the intensities of the diffraction lines in the powder diagrams given by this substance. They conclude "that there is no serious objection to the hypothesis of molecular rotation as an explanation of the gradual transition in sodium nitrate," this conclusion being reached by a qualitative intensity discussion, the quantitative calculation of the rotating model presenting "a most interesting difficulty."

Now the scattering power of a ring model has been calculated by Coster[2] and by Kolkmeyer[3] with a view to the possibility of electron binding rings in diamond and by one of us[4] in testing electronic models of lithium. For the case of sodium nitrate we have now performed the intensity

[1] Kracek, Posnjak and Hendricks, This Journal, **53**, 3339 (1931).

[2] Coster, *Verslag. Akad. Wetenschappen Amsterdam*, **28**, 391 (1919).

[3] Kolkmeyer, *ibid.*, **28**, 767 (1920).

[4] Bijvoet, *Rec. trav. chim.*, **42**, 874 (1923).