The excess cupferron was destroyed with nitric and sulfuric acids, and the chromium was determined by the procedure already described;[6] the method was then applied to a number of naturally occurring rubies. The results of these determinations are recorded in Table II. It is worthy of notice that ruby No. 1 was associated with fuchsite, and that ruby No. 8 occurred in diaspore with biotite.

A glance at Table II shows that there is no regularity in the ratios of Cr_2O_3 to Fe_2O_3; on the other hand, the depth of color in the ruby seems to be proportional to the total amount of coloring oxide present, listed in the last column of Table II, rather than to the chromic oxide alone. The values in the last column were obtained by adding the average percentage of Fe_2O_3 and Cr_2O_3 in each specimen, and are in remarkable agreement with what has already been stated regarding the amount of pigmenting oxide necessary to produce the typical color in synthetic ruby.

Work is now in progress in this laboratory on the synthesis of ruby, using ferric oxide alone as coloring agent.

SUMMARY

A number of specimens of naturally occurring ruby have been analyzed for both their iron and chromium content.

The total amount of coloring oxide in these rubies has been found to vary between 0.83 and 3.5 per cent.

The depth of color of the rubies analyzed seems to be directly proportional to the total amount of pigmenting oxide present, irrespective of the amount of chromic oxide found.

There is apparently no fixed ratio of iron to chromium in the rubies analyzed.

The total amount of pigmenting oxide found in the more deeply colored natural rubies coincides with the amount that must be incorporated into synthetic preparations in order to duplicate the color of the natural gem.

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THE MOLECULAR WEIGHT OF THYROGLOBULIN[1]

THE preparation of highly purified thyroglobulin[2] has made possible determinations of the molecular weight of this protein in the ultra-centrifuge.[3] Throughout the pH stability range from 4.8 to 11.3 the sedimentation constant, s, has been found to average 19.2×10^{-13} in the case of thyroglobulin prepared from hogs grown in the United States as well as in Sweden. The preparations were quite homogeneous and there was little non-centrifugable material. A sample of human thyroglobulin showed essentially the same sedimentation constant, although the preparation was not quite so homogeneous. At pH 3 on the acid side of the iso-electric point (which has been found to be at about pH 4.5 by Dr. Kai O. Pedersen[4]) hog thyroglobulin is incompletely split into two components, of which the lighter shows an s of about 11×10^{-13}. On the alkaline side of the stability range, at pH 12, there is also splitting into components of lower molecular weight. A sedimentation equilibrium run has indicated a molecular weight of about 700 000. From the sedimentation constant of 19.2×10^{-13} and the diffusion constant found according to the method of Tiselius[5] by Mr. A. G. Polson to be about 2.0×10^{-7} a molecular weight of about 800 000 is indicated. The partial specific volume has been found to be 0.72, an unusually low value for a protein. Additional data and a detailed discussion will be given in a later paper.

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[6] John Simon Guggenheim Memorial fellow, summer of 1934.

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