ART. XVI.—*On Ceric Chromate*; by PHILIP E. BROWNING and CHARLES P. FLORA.

[Contributions from the Kent Chemical Laboratory of Yale University—CXIV.]

BÖHM* in a recent paper descriptive of his thorough investigations of the application of chromic acid to the separation of the cerium earths, states that when the mixed oxides of cerium lanthanum and didymium are brought in contact with a calculated amount of chromic acid, a little water added, and heat applied for a time, an orange red amorphous powder remains which proves to be a basic ceric chromate. In connection with a study of the methods of separating the cerium earths, begun last summer, we had occasion to make an experiment similar to that described by Böhm, differing possibly in this respect, that we used a decided excess of the chromic acid (100 grms. of the oxides with 150 grms. of chromic acid and 200^{cm³} of water).

The product which we obtained was a bright scarlet crystalline salt, which, when washed sparingly with water and dried over sulphuric acid, became a little darker in color but retained its crystalline condition. Examined under the microscope the salt appeared homogeneous, and the crystalline form orthorhombic, the prevailing habit being prismatic, $m \wedge m'''$, $110 \wedge 1\bar{1}0$, being approximately 58° C. The macropinacoid, a (100), is generally present, the brachypinacoid, b (010), is well developed, and a flat brachydome and the basal plane, c (001), are the terminating forms. The crystals are etched or pitted, are slightly pleochroic, and exhibit parallel extinction and low birefringence. When treated with water the salt loses chromic acid and becomes an orange yellow. It may be heated to about 150° C. without loss of weight. Between 150° and 180° C. it loses water and becomes brownish red, still retaining much the same original exterior form. Above 180° C. it decomposes. It is quite readily soluble in dilute acids, especially sulphuric acid, and is easily decomposed by potassium or sodium hydroxide into the alkali chromate and ceric hydroxide. The ceric hydroxide thus formed is quite readily soluble in acids and promises to be a convenient starting point for the preparation of ceric salts. Qualitative tests proved the absence of both yttrium and didymium.

Analysis of the salt gave the following results: Five closely agreeing determinations of water, six determinations of ceric oxide, among which the greatest variation was about one per cent, and sixteen determinations of chromic acid showing as the greatest variation about two per cent, gave the averages tabulated below:

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Salt examined.		$\text{Ce}(\text{CrO}_4)_2 \cdot 2\text{H}_2\text{O}$ calculated.	
CeO_2	41.94	CeO_2	42.14
CrO_3	49.61	CrO_3	49.04
H_2O	8.82	H_2O	8.82
	<hr/> 100.37		<hr/> 100.00

From these analyses we feel justified in assuming the crystalline salt to be a close approximation to a compound whose constitution would be expressed by the symbol $\text{Ce}(\text{CrO}_4)_2 \cdot 2\text{H}_2\text{O}$.

The material from which the mixed oxides used in this work were obtained was a mixture of sulphates of cerium lanthanum and didymium, carrying a trace of yttrium.

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