THE INSOLUBLE CHROMICYANIDES

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The Insoluble Chromicyanides by Frederick Van Dyke Cruser

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Trieste

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By

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DISSERTATION

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INTRODUCTION.

As comparatively little is known about the chemistry of the insoluble chromicyanides, and as the work that has been done is of an early date, a more thorough and exhaustive investigation on this subject seemed to be of importance.

F. V. D. C.

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This investigation was carried out under the direction of Professor Edmund H. Miller, and I take this opportunity to express my sincere thanks for his kindly interest in the work, and for his valuable assistance.

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May 1, 1906.

TABLE OF CONTENTS.

THE INSOLUBLE CHROMICYANIDES.

Potassium Chromicyanide.

Böckman* prepared a salt by heating together solutions of potassium hydroxide, chromium hydroxide, with an excess of potassium cyanide. The liquid is colored reddish brown, and will deposit yellow crystals, which are subsequently purified by recrystallization, which crystals have the same form and analogous composition to the potassium salt of ferricyanide and cobalticyanide. The formula is $K_3Cr_2(CN)_{12}$, equivalent to $K_3Cr(CN)_6$ at present. Stridsberg† has worked on the preparation and analysis of potassium chromicyanide. He digests a hot solution of potassium cyanide with potassium chromium chloride for an hour, and evaporates. On cooling the red filtrate, crystals of potassium chromicyanide, $Cr_2CY_3 . 3K\,CY$ (equivalent to $K_3Cr(Cn)_6$) separate.

Kaiser‡ prepared the salt by adding to a fairly concentrated solution of potassium cyanide (60 gms.), heated nearly to boiling, small portions at a time of chrom alum (50 gms.). This mixture is heated for about one hour, until its weight is about 300 gms. After cooling, he adds 30 gms. of alcohol (80%), and filters. The filtrate is evaporated, and the yellow crystals which form are filtered off, and purified by recrystallization, until the crystals have a pure yellow color, the first crop of crystals, occluding mother liquor, have a reddish yellow color. The salt is water free, and has the formula $3K\,CN . Cr_2(CN)_3$, equivalent to $K_3Cr(CN)_6$. The crystal form according to Kopp is the same as that of potassium ferricyanide, namely, monoclinic.

At the ordinary temperature, 100 parts of water dissolve 30.9

*Traite de Chimique Organique, J. Liebig, vol. I., p. 174; Gmelin, Handbook of Chemistry, vol. VII., p. 420; Handwörterbuch d. chem. Fehling, vol. II., p. 663; Jahresb, 1864, vol. 17, p 302.

†Jahresb, 1864, vol. 17, p. 304; N. Arch. ph. nat. XXII., p. 151.

‡Annalen der Chemie und Pharmacie, III. suppl. p. 163; Gmelin Hand 4 aufl. 4, 335; Gmelin Handbook of Chemistry, VII., p. 420; Handwörterbuch d. chem. Fehling, p. 663; Jahresb. 1864, vol. 17, p. 302; Chem. Central. 1865, p. 259.