

of wedge-shaped forms and short, stout prisms differing markedly in habit from the material melting at 164° . In parallel polarized light with crossed nicols, the material was characterized by not extinguishing sharply when the microscope stage was rotated. In convergent polarized light with crossed nicols, biaxial interference figures showing one optic axis in the center of the field or in the eccentric position were common. The material was not soluble in the ordinary organic liquids. The refractive indices were as follows: n_{α} , 1.600; n_{β} , 1.625; n_{γ} , 1.680; all ± 0.003 (Fig. 2).

Dihydrorotenone exists in dimorphic forms, the one melting at 164° , the other at 216° . The high melting form is the more stable.

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Composition of Copper Xanthate.¹—Much confusion exists concerning the formula of the yellow precipitate formed on adding a cupric salt to a xanthate solution. From the time of its first analysis² until recently, the discoverer's claim that it is a cuprous salt was generally accepted. Then Johnson,³ assuming that all the xanthate is precipitated—whereas half of it is oxidized to dixanthogen—believed it to be a cupric salt. This view has been accepted by recent workers,^{4,5,6,7,8} with a few exceptions.^{9,10}

The writer has analyzed three samples of the precipitate made by adding excess copper sulfate solution to fresh solutions of potassium xanthate. After filtering, washing with water, triturating with alcohol to remove the dixanthogen, filtering again, washing with alcohol and drying overnight, the copper in a known weight of precipitate was determined by dissolving with saturated bromine water, boiling off the excess oxidant, evaporating to a small volume, adding 1 g. of potassium iodide and titrating with thio-sulfate. From these data, assuming one atom of copper to each molecule,

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² Zeise, *Ann. Physik. Chem. (Poggendorff)*, **35**, 487–514 (1835).

³ Johnson, *THIS JOURNAL*, **28**, 1210–1214 (1906).

⁴ Harding and Doran, *ibid.*, **29**, 1476–1482 (1907).

⁵ Calcott, English and Downing, *Eng. Mining J.-Press*, **118**, 980–981 (1924).

⁶ Hallett and Ryder, *ibid.*, **119**, 690 (1925).

⁷ Huff, *THIS JOURNAL*, **48**, 81–87 (1926).

⁸ Holtz, "Dissertation," Johns Hopkins University, 1930, pp. 23–24.

⁹ Spielmann and Jones, *J. Soc. Chem. Ind.*, **38**, 185–187T (1919).

¹⁰ Duncan, Ott and Reid, *Ind. Eng. Chem.*, **23**, 382 (1931).

the molecular weight of the precipitate was calculated. The values so obtained, 190.8, 190.4 and 188.2, differ from the theoretical for cuprous xanthate ($\text{CuSCSOC}_2\text{H}_5$), 184.7, by only two or three per cent., the discrepancy being attributed to occlusion of dioxanthogen. As the molecular weight of cupric xanthate ($\text{Cu}(\text{SCSOC}_2\text{H}_5)_2$), 305.9, is very much larger, the precipitate is undoubtedly the cuprous salt.

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The Melting Point of Normal Butyl Ether.—Incidental to some other research the melting point of normal butyl ether has been determined, we believe, for the first time.

Eastman Kodak Company pure normal butyl ether was further purified by distillation in a small laboratory column, the middle third being used.

The apparatus used in this measurement consisted of a copper calorimeter wound with a heater and supplied with a copper-constantan thermocouple. This was hung by threads within a heavy copper cylinder, which was also provided with heater and thermocouple. The whole was suspended in a silvered glass tube connected to a mercury vapor pump to provide thermal insulation.

The apparatus was cooled below the melting point of the normal butyl ether and evacuated. The calorimeter was then warmed gradually by means of the heating coil. The ether melted very sharply at $177.8 \pm 0.2^\circ\text{K}$., the sharpness of the melting point being sufficient evidence of the purity of the sample.

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