The Stability Region of CrO_2 at High Temperature and High Pressure and the Synthesis of Spinel-type Oxides Containing Cr^{4+}

by Osamu FUKUNAGA, Akira SAWAOKA, Shinroku SAITO

(Discussion on the Artificial Minerals at Osaka in 1965)

Abstract

1. Stability region of CrO_2

CrO_2 has been synthesized under high oxygen pressure by previous investigators. The authors found that CrO_2 was stable in the higher temperature range under solid pressure. The starting material of the runs was underfired CrO_3 whose composition was $CrO_{2.5}$. The apparatus used was a piston-cylinder type high pressure apparatus. The boundary curve between CrO_2 and Cr_2O_3 was given by the expression,

$$P(kb) = 7.4 + 0.019T(^{\circ}C)$$

2. Synthesis of Me_2CrO_4

If spinels like Me_2CrO_4($Me = Mg^{2+}$, Ni^{2+}, Co^{2+}) are satisfactorily synthesized, it is expected that Cr^{4+} ion may be contained in crystal. The results, however, were contradictory. With magnetic measurement, the curie point of Co_2CrO_4 was in accordance with that of $CoCr_2O_4$. The lattice constant of the former was 8.24A, while the latter 8.33 to 8.35A.