

The Stability Region of  $\text{CrO}_2$  at High Temperature and  
High Pressure and the Synthesis of Spinel-type Oxides Containing  $\text{Cr}^{4+}$   
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(Discussion on the Artificial Minerals at Osaka in 1965)

Abstract

1. Stability region of  $\text{CrO}_2$

$\text{CrO}_2$  has been synthesized under high oxygen pressure by previous investigators. The authors found that  $\text{CrO}_2$  was stable in the higher temperature range under solid pressure. The starting material of the runs was underfired  $\text{CrO}_3$  whose composition was  $\text{CrO}_{2.5}$ . The apparatus used was a piston-cylinder type high pressure apparatus. The boundary curve between  $\text{CrO}_2$  and  $\text{Cr}_2\text{O}_3$  was given by the expression,

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

2. Synthesis of  $\text{Me}_2\text{CrO}_4$

If spinels like  $\text{Me}_2\text{CrO}_4$  ( $\text{Me} = \text{Mg}^{2+}, \text{Ni}^{2+}, \text{Co}^{2+}$ ) are satisfactorily synthesized, it is expected that  $\text{Cr}^{4+}$  ion may be contained in crystal. The results, however, were contradictory. With magnetic measurement, the curie point of  $\text{Co}_2\text{CrO}_4$  was in accordance with that of  $\text{CoCr}_2\text{O}_4$ . The lattice constant of the former was 8.24Å, while the latter 8.33 to 8.35Å.