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AUTHORS: ② Putilin, Yu. M., Galuzo, V. N., Ponomarev, V. D.

TITLE: ⑥ Crystallo-optic investigation of the  $K_2TiF_6$ -NaCl- $TiO_2$  system

SOURCE: ⑨ Akademiya nauk Kazakhskoy SSR. Institut metallurgii i obogashcheniya. Trudy. v. 5, 1962, Tsvetnaya metallurgiya, 95 - 107

TEXT: The main purpose of the investigation was the study of solid synthetic alloys in the  $K_2TiF_6$ -NaCl- $TiO_2$  system. Cooled melts of 63 compositions in the eutectic-adjacent zone of the  $K_2TiF_6$ -NaCl binary system were investigated by a method in which samples of 55 alloys were classified by compositions with a constant ratio of potassium fluorotitanate to sodium chloride. The crystallo-optic analysis included the study of titanium dioxide solubility in  $K_2TiF_6$ -NaCl melts; the study of phase composition of cooled specimens of the  $K_2TiF_6$ -NaCl- $TiO_2$  system and the description of the optical properties of the specimens under investigation. Additional experiments were conducted to check the data obtained by the crystallo-optic method. The investigation yielded the following results.

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Crystallo-optic investigation of the...

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In specimens of the system investigated the following phases were revealed; 1) an anisotropic phase with  $n_g = 1.630$ ,  $n_p = 1.501$ ; 2) an isotropic phase with  $n$  varying from 1.460 to 1.513; 3) "secondary" rutile in the form of acicular crystals (which are crystallized out of the melt and are formed from dissolved "initial" rutile, supplied to the charge prior to melting); 4) "initial" rutile in the form of high-dispersed powderlike impurities. The appearance of "initial" rutile is observed in specimens where its amount exceeds the solubility limit. This condition is considered as a basis in the indirect investigation of the solubility of titanium dioxide in the melts by the crystallo-optic method. The authors show for the first time the possibility of using crystallo-optic analysis as a method for the indirect determination of the solubility of titanium dioxide in melts of potassium fluorotitanate with sodium chloride. It was established that in the investigated range the solubility of titanium dioxide is a function of the potassium fluorotitanate content in the melt. At a 80:20 ratio of potassium fluorotitanate to sodium chloride, the titanium dioxide dissolves at 750°C up to 4%; under the same conditions solubility drops to 2.5% if the ratio is 50:50. It was established that potassium fluorotitanate and sodium chloride do not exist in free state in the investigated alloys and that titanium dioxide does not form any new chemical compounds. There are 2 tables and 8 figures.

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