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PREPARATION AND SOME PROPERTIES OF Nb(Ta) COMPLEX FLUORIDES AND OXYFLUORIDES

V. T. Kalinnikov and A. I. Agulyansky

Institute of Chemistry and Technology of Rare Eelements and Mineral Raw Materials, Apatity (U.S.S.R.)

Double complex fluorides and oxyfluorides of niobium and tantalum form a group of compounds mostly of anion octahedral type, their structure being determined by the ratio of anions amount (O^{2-}, F^{-}) and that of octahedral cations (X:Me). In decreasing X:Me from 8 to 6 the compounds of the island type are formed, while in decreasing it from 5 to 3 those of the chain, laminated and framework type are obtained. The availability of the non-octahedral cations is noted as being necessary in the structures of the above mentioned type. The coordination type compounds (X:Me = 3) may be prepared if only steric-like cations of Nb (or Ta) are present in the structure. Synthesis of complex Nb(Ta) fluorides and oxyfluorides can be carried out by the hydrofluoride technique /1/. Fluorotantalates of alkali metals are shown to be produced by interaction between Ta_2O_5 and alkali metal fluoride in the presence of ammonium hydrofluoride. When substituting Ta_2O_5 for Nb_2O_5 M_2NbOF_5-type is formed.

The compounds with the ratio X:Me=5÷3 are produced in the systems M_2CO_3-$Nb(Ta)O_2F$, where M is an alkali metal. The compounds of $Li_4Nb(Ta)O_4F$ with NaCl structure (X:Me=1), as well as those of $CoNbO_3F$, having the structure of rutile type (X:Me=2), and the compound of $M^{II}NbOF_5$ with the ReO_3 structure (X:Me=3) have been obtained.

1 V.T.Kalinnikov, Y.I.Balabanov, A.I.Agulyansky. Fifth European Meeting on Ferroelectricity (Abstracts). Spain, 1983, p. 340.