

NOTE ON PHASE EQUILIBRIA IN THE SYSTEM $\text{Na}_2\text{O}-\text{TiO}_2$

By Edward W. Washburn and Elmer N. Bunting

ABSTRACT

The following compounds are formed in the binary system $\text{Na}_2\text{O}-\text{TiO}_2$: Na_2TiO_3 melting at 1030 C, $\text{Na}_2\text{Ti}_2\text{O}_5$ melting at 985 C, and $\text{Na}_2\text{Ti}_3\text{O}_7$ melting at 1128 C.

As a part of the Bureau's program of research on phase equilibria in systems containing refractory oxides, it had been planned to study a variety of systems containing TiO_2 as one of the components, since this interesting oxide has in recent years become commercially available in large tonnage and in a remarkably high state of purity. The first investigation dealing with the different crystalline forms of TiO_2 itself and with equilibria in the systems $\text{TiO}_2-\text{SiO}_2$ and $\text{TiO}_2-\text{Al}_2\text{O}_3$ has been completed and published.¹ With the inauguration of the economy program on July 1, 1933, it became necessary to abandon research work in this field.

The purpose of the present note is to place on record a few results which have been secured in an incomplete study of the system $\text{Na}_2\text{O}-\text{TiO}_2$. Mixtures of these two oxides were found to crystallize so readily that it was not necessary to employ the laborious quenching method; in fact it could not be used on account of the rapidity of crystallization. Instead, the method of heating curves was employed. The essentials of the method as applied to these mixtures will be clear from the accompanying diagram. The results indicated the formation of three compounds with congruent melting points as follows: Na_2TiO_3 melting at 1030 C, $\text{Na}_2\text{Ti}_2\text{O}_5$ melting at 985 C, and $\text{Na}_2\text{Ti}_3\text{O}_7$ melting at 1128 C.

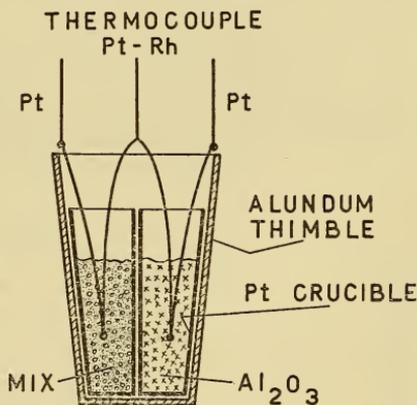


FIGURE 1.—Twin Pt crucibles in alumina thimble for determining heating curves.

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¹ B. S. Jour. Research, vol. 11, p. 719, 1933.