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Sodium oxide effect on B_2O_3–Me_2O_3 (Me = Er, Tm, Yb, Lu) melts surface tension

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Abstract

The results of sodium borate melts containing 8.7 mass % Na_2O and 1 % mass Me_2O_3 oxides (Me = Er, Tm, Yb, Lu) surface tension measuring are presented. To obtain homogeneous samples composition and structure, the rare earth elements oxides were previously subjected to mechanical activation by mechanical dispersion in a planetary activator mill. The experiments were carried out by the sessile drop method in high-purity helium atmosphere at the 800-1200 °C temperature range. The surface tension temperature dependencies are obtained and its temperature coefficients are calculated. Surface tension of the investigated B_2O_3-Na_2O-Me_2O_3 (Me = Er, Tm, Yb, Lu) melts increases linearly at temperature increasing. Its dependence on the lanthanide atomic number is non monotonic and follows to the intra-nuclear periodic dependence that is proper to the lanthanide elements series.

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