VISCOSITY OF LIQUID ALLOYS OF COBALT WITH SILICON AND BORON

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In the present work, the temperature (polytherm) and concentration (isotherm) dependences of the kinematic viscosity of melts of Co-Si, Co-B and Co-Si-B systems have been studied.

Viscosity studies were carried out by the method of torsional vibrations using an automated installation [1] in a protective atmosphere of helium in the crucibles of Al_2O_3 in the presence of two end surfaces of friction [2].

Polytherms of the viscosity of Co-Si and Co-B melts (up to 54 at.% metalloid), as well as melts of $Co_{89}B_xSi_{11-x}$, $Co_{81}B_xSi_{19-x}$ and $Co_{75}B_xSi_{25-x}$ systems have a monotonic character and are well described by the Arrhenius equation. This indicates that a sharp change in the structure of the melts does not occur upon heating.

The viscosity isotherms of Co-Si melts have a domed shape with maximum values in the range of 30-40 at.% silicon. The viscosity of the Co-B melts at a boron content up to 15 at.% and in the range from 36 to 50 at.% practically does not depend on the concentration. The values of the melt viscosity increase rapidly in the concentration range from 20 to 36 at.% boron. The nonmonotonic nature of the viscosity isotherms indicates a change in the type of short-range ordering in the melt with a change in composition.

The viscosity isotherms of quasi-binary Co-Si-B systems are monotonic. The replacement of silicon atoms by boron atoms in these systems has practically no effect on the viscosity of the melts.

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