

STRUCTURE OF THE ELECTRON BEAM WELDING CONNECTIONS

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Abstract

The structure, properties and welding parameters of Nb55%Ti -Ti and Nb55%Ti-Nb connection of cavities for XFEL are investigated. These are for example the welding connections of conical disc with helium tank rings (bellow unit and reduction ring) and of conical disc with reference ring. Several samples have been prepared using the electron beam welding equipment of DESY and Lufthansa Technik AG. The metallographic structure analysis, EDX, measurement of gas content, Vickers hardness HV, RRR and electrical resistance measurement have been done. Properties of the welding connection Nb55%Ti-Nb present mainly the bcc body-centered cubic β -phase according the phase diagram of NbTi alloy. The HV changes rather uniformly, annealing at 1400°C does not lead to changes of the behaviour. The small maximum of the critical superconducting temperature T_c in agreement with the element distribution in the welding connection is observed. Properties of the welding connection Nb55%Ti-Ti present the mixture of the bcc β -phase and the hexagonal α -phase. Maximum of the HV and increased hydrogen content in the welding connection was observed.

**CONTRIBUTION NOT
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