Superconductivity in ZrB_{12} with various boron isotope content

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In the unconventional superconductor ZrB_{12} with phase transition from type-I to type II/1[1,2] the heat capacity and magnetization measurements have been carried out on high quality single crystals with various boron isotopes. Critical temperature $T_C \approx 6$ K and thermodynamic field $H_C \approx 420$ G, density of electron states' renormalization effect, electron-phonon interaction $\lambda \sim 0.23$ and superconducting gap $2\Delta(0) \sim 20.5$ K have been estimated and compared between $Zr^{10}B_{12}$, $Zr^{11}B_{12}$ and $Zr^{nat}B_{12}$ compounds. Our experiments reveal only slight changes both in the aforementioned characteristics and in the frequency of quasi-local mode ($\Theta_E \sim 180$ K), which is responsible for BCS-type superconductivity in zirconium dodecaboride. An analysis of field dependent specific heat in the type-II/1 superconducting state allows evaluating the vortex-core contribution in the Zr^NB_{12} series under investigation.

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