

## Thermodynamic studies of YB<sub>6</sub>

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Here we present a comprehensive study of five YB<sub>6</sub> samples with slightly different Y/B ratios with  $T_c \sim 4$  K, 5.8 K, 6 K, 7.1 K and 7.4 K using a combination of ac-calorimetry and local magnetometry. We measured the heat capacity behaviour in different fields up to 0.5 T and at various temperatures during temperature and magnetic field sweeps respectively. Thus, we obtained temperature dependencies of the upper critical magnetic fields  $H_{c2}$ . Using an array of miniature Hall probes, we also inspected mechanism of magnetic field penetration into and vortex distribution inside the sample. From measurements at different temperatures, the temperature dependencies of the lower critical magnetic field  $H_{c1}$  were determined for all samples. Evolution of the  $H_{c1}$ ,  $H_{c2}$  and related parameters  $\lambda$ ,  $\xi$  respectively with the critical temperatures were determined. The coupling ratios  $2\Delta/k_B T_c$  were determined from both heat capacity and magnetometry measurements performed on the same crystals as well.