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# MEASUREMENT OF $H_{c1}$ IN A SINGLE CRYSTAL OF $YBa_2Cu_3O_7$ WITH LOW PINNING

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The measurement of $H_{c1}$ in BYCO is often ambiguous because the presence of large pinning forces makes it difficult to discern exactly where the first deviation from linearity occurs. In addition there are complications because demagnetizing factors are often not well known. By utilizing a single crystal of YBCO with a nearly cubic shape, the uncertainty in the demagnetizing factor was minimized. In addition, the crystal used exhibited a very small amount of pinning with H applied perpendicular to the c axis, and a sharp break in the initial magnetization vs. field curve could be observed over a wide range of temperature. This allowed a precise determination of $H_{c1}$. The measured values of $H_{c1}$ could be well described by the Abrikosov relation[1] with a Ginzburg-Landau parameter which varied linearly with temperature.

1. A.A. Abrikosov, "Fundamentals of the Theory of Metals", North Holland, Amsterdam (1988), p. 325.