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Anisotropic H_{c2} curves determined up to 92 T and the signature of two-band superconductivity in the novel superconductor $\mathbf{Ca_{10}(Pt_4As_8)((Fe_{1-x}Pt_x)_2As_2)_5}$ EUNDEOK MUN, VIVIEN ZAPF, OSCAR AYALA, ROSS MCDONALD, NEIL HARRISON, National High Magnetic Field Laboratory (NHMFL), Los Alamos National Lab (LANL), Los Alamos, NM, NI NI, JARED ALLRED, ROBERT CAVA, Department of Chemistry, Princeton University, Princeton, NJ 08544, USA — The upper critical fields, $H_{c2}(T)$, of single crystals of the novel superconductor $Ca_{10}(Pt_4As_8)((Fe_{1-x}Pt_x)_2As_2)_5$ with x=0.02 were determined over a wide range of temperatures down to $T = 1.42$ K and magnetic fields up to H= 92 T. The measurements of anisotropic $H_{c2}(T)$ curves are performed in pulsed magnetic fields using radio-frequency contactless penetration depth measurements for magnetic field applied both parallel and perpendicular to the ab-plane. Whereas a clear upward curvature in $H^c_{c2}(T)$ along H||c is observed with decreasing temperature, the $H^{ab}_{c2}(T)$ along H||ab shows a flattening at low temperatures. The rapid increase of the $H^c_{c2}(T)$ suggests that the superconductivity can be described by two dominating bands. The anisotropy parameter, $H^{ab}_{c2}(T)$ /$H^c_{c2}(T)$, is $\sim$7 close to T_c and decreases considerably to $\sim$1 with decreasing temperature, showing rather weak anisotropy at low temperatures.

Eundeok Mun
National High Magnetic Field Laboratory (NHMFL),
Los Alamos National Lab (LANL), Los Alamos, NM

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