Upper critical field in Ba(Fe$_{1-x}$Co$_x$)$_2$As$_2$ and FeSe$_{1-x}$Te$_x$ compounds

CHIARA TARANTINI, JAN JAROSZYNSKI, JIANYI JIANG, ALEX GUREVICH, DAVID C. LARBALESTIER, National High Magnetic Field Laboratory, Florida State University, Tallahassee, FL 32310, USA, RONGYIN JIN, ATHENA S. SEFAT, MICHAEL A. MCGUIRE, BRIAN C. SALES, DAVID G. MANDRUS, Materials Science & Technology Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831, USA — We report $H_{c2}$ measurements in high magnetic field up to 31 T on Ba(Fe$_{1-x}$Co$_{1-x}$)$_2$As$_2$ and FeSe$_{1-x}$Te$_x$ pnictide compounds for different doping levels. Both materials exhibit a very high upper critical fields and unconventional temperature dependencies of $H_{c2}(T)$ with the extremely high slopes $dH_{c2}/dT$ from 10 to 30 T/K near $T_c$ and a relatively low anisotropy: $\gamma = H_{c2}^// / H_{c2}^\perp$ for the doped ternary compound and $\gamma \approx 1.1 \div 1.2$ for the binary one. The observed temperature dependences of $H_{c2}(T)$ and the high $H_{c2}$ values well above the BCS paramagnetic limit indicate the importance of the Zeeman pairbreaking effects in these compounds.

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