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Strong suppression of superconductivity and Kondo coherence by Yb substitution in $CeCoIn_5$ epitaxial films
MASAAKI SHIMOZAWA, SATOSHI YASUMOTO, Department of Physics, Kyoto University, MASAYUKI NAKAMURA, RCLTMS, Kyoto University, TATSUYA WATASHIGE, YUTA MIZUKAMI, Department of Physics, Kyoto University, HIROAKI SHISHIDO, Department of Physics and Electronics, Osaka Prefecture University, TAKASADA SHIBAUCHI, Department of Physics, Kyoto University, TAKAHITO TERASHIMA, RCLTMS, Kyoto University, YUJI MATSUDA, Department of Physics, Kyoto University — One of the important issues in strongly correlated electron system is the relationship between unconventional superconductivity and quantum criticality. Among them, the heavy-fermion superconductor $CeCoIn_5$ is a key material situated near an antiferromagnetic quantum critical point. When rare-earth ions are substituted for Ce, superconductivity and Kondo-lattice coherence are usually suppressed, but it has been recently pointed out from bulk studies that Yb substitution may be distinguished because of its valence instability. Here we report our recent study on $Ce_{1-x}Yb_xCoIn_5$ epitaxial thin films grown by the molecular beam epitaxy, which have high homogeneity. We find that the superconducting transition temperature is suppressed with increasing x much more rapidly than the previous bulk results, and that the coherence temperature is suppressed concurrently. We also observe a systematic reduction of the low-temperature Hall coefficient magnitude with x, establishing that the antiferromagnetic fluctuations fade even by the Yb substitutions.

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