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Hybrid heavy-fermion superlattices of $CeCoIn_5/CeRhIn_5$ MASAHIRO NARITSUKA, TOMOHIRO ISHII, RINTARO TODA, SHIGERU KASAHARA, YUICHI KASAHARA, YOSHI TOKIWA, TAKAHITO TERASHIMA, YUJI MATSUDA, Kyoto University — Interplay between superconductivity and magnetism continues to provide central topics in condensed matter physics. Among others, $CeTIn_5$ (T = Co, Rh) compounds offer one of the suitable platforms for the study of this important issue — $CeCoIn_5$ undergoes superconducting transition at $T_c = 2.3$ K while $CeRhIn_5$ orders antiferromagnetically below $T_N = 3.8$ K at ambient pressure. An intriguing issue concerns coexistence of superconductivity and antiferromagnetism which could be realized at an artificial interface of different materials, but it is not clear how the two different states are affected each other at the interface. Here, by using atomic layer-by-layer molecular beam epitaxy, we fabricate superconducting-antiferromagnetic hybrid superlattices consisting of alternating layers of $CeCoIn_5$ and $CeRhIn_5$. Transport measurements confirm the presence of both superconducting and antiferromagnetic phases. The coexistence of superconductivity and antiferromagnetism in a hybrid system is discussed based on the proximity effect at the interface.

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