

Abstract Submitted
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Growth and properties of heavy fermion thin films and superlattices¹ YIZE LI, MAO ZHENG, BRIAN MULCAHY, L.H. GREENE, JAMES N. ECKSTEIN, University of Illinois at Urbana-Champaign — We have grown thin films of the heavy fermion phases CeCu₂Ge₂ (CCG) and CeFe₂Ge₂ (CFG) on MgO and DySrO₃ substrates using molecular beam epitaxy. We find that the growth begins via island nucleation leading to a granular morphology, since there are two equivalent registrations of the film with the substrate. After nucleating, the grains grow flat with c-axis orientation. These single phase films show similar temperature(T) dependent transport behavior as seen in single crystals of the materials, including for CCG Kondo scattering and the emergence of coherent coupling of the heavy fermion transport channel at low T and for CFG a monotonic decrease in resistivity as the temperature is lowered. Superlattices combining CCG and CFG in different supercell architectures were also grown. In transport, they show a systematic evolution with composition between the distinct R(T) behavior of the two parent phases. A correlation between spectroscopic measurements and resistivity was found and details will be presented.

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