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Electronic and magnetic properties of (1 1 1)-oriented $CoCr_2O_4$ epitaxial thin film[1] XIAORAN LIU, MICHAEL KAREEV, YANWEI CAO, Department of Physics, University of Arkansas, JIAN LIU, Department of Physics, University of California, Berkeley, SRIMANTA MIDDEY, DEREK MEYERS, Department of Physics, University of Arkansas, JOHN FREELAND, Advanced Photon Source, Argonne National Laboratory, JAK CHAKHALIAN, Department of Physics, University of Arkansas, DEPARTMENT OF PHYSICS, UNIVERSITY OF CALIFORNIA, BERKELEY COLLABORATION, MATERIALS SCIENCE DIVISION, LAWRENCE BERKELEY NATIONAL LABORATORY, BERKELEY COLLABORATION, ADVANCED PHOTON SOURCE, ARGONNE NATIONAL LABORATORY COLLABORATION — We report on the fabrication of high quality (1 1 1)-oriented ferrimagnetic normal spinel $CoCr_2O_4$ epitaxial thin films on single crystal Al_2O_3 substrates. The structural, electronic and magnetic properties were characterized by *in-situ* reflection high energy electron diffraction, atomic force microscopy, X-ray diffraction, X-ray photoemission spectroscopy, SQUID magnetometry and element resolved resonant X-ray magnetic scattering. The comprehensive characterization reveals that no disorder in the cation distribution or multivalency issue is present in the samples. As a result, Kagomé and triangular layers are naturally formed via this specific growth approach. These findings offer a pathway to fabricate two dimensional Kagomé heterostructures with novel quantum many-body phenomena by means of geometrical design.

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