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Epitaxial Growth of Heusler Co_2MnSi Heterostructures: Electronic and Structural Properties[1] THOMAS NEULINGER, Department of Physics; University of California, Santa Barbara, SAHIL PATEL, Department of Materials Science; University of California, Santa Barbara, ALEXANDER KOZHANOV, California NanoSystems Institute; University of California, Santa Barbara, BRIAN SCHULTZ, Department of Electrical and Computer Engineering; University of California, Santa Barbara, CHRIS PALMSTRØM, Department of Electrical and Computer Engineering and Materials Science; University of California, Santa Barbara — The Heusler alloy Co_2MnSi is predicted to be a half-metal, a material that is spin-polarized at the Fermi energy. We have demonstrated growth by molecular beam epitaxy of Co_2MnSi, Cr/Co_2MnSi, and a complete $Co_2MnSi/MgO/Co_2MnSi(001)$ magnetic tunnel junction on epitaxial GaAs(001) surfaces without air exposure. Epitaxial Cr layers have been used to exchange bias Co_2MnSi. In-situ electron diffraction and scanning tunneling microscopy, and ex-situ X-ray diffraction techniques are used to characterize the crystal quality. The magnetic properties are investigated using vibrating sample and superconducting quantum interference device magnetometry. We present these results and will compare them with temperature dependent magnetotransport and tunneling spectroscopy measurements, with emphasis on the influence of Co_2MnSi surface termination.

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