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Growth and characterization of half-Heusler half-metal candidate $\mathbf{CoTi_{1-x}Fe_xSb}$[1] SEAN HARRINGTON, TOBIAS BROWN, ANTHONY RICE, University of California - Santa Barbara, OZGE MERCAN, LEYLA OLAKEROL ARSLAN, Gebze Technical University, Physics Department, Kocaeli, 41400 Turkey, CHRIS PALMSTRM, University of California - Santa Barbara — Recent predictions suggest the semiconducting half-Heusler compound, CoTiSb, exhibits half-metallicity when substitutionally alloyed with Fe. However, to date, few studies have examined the growth of high-quality single crystal thin films of Fe doped CoTiSb. Here, we report the epitaxial growth of the substitutionally alloyed half-Heusler series $CoTi_{1-x}Fe_xSb$ by molecular beam epitaxy and the influence of Fe on the structural, electronic, and magnetic properties. $CoTi_{1-x}Fe_xSb$ epitaxial films are grown on InAlAs (001) grown on InP (001) substrates for concentrations $0 \leq x \leq 1$. The films are epitaxial and single crystalline, as measured by reflection high-energy electron diffraction and XRD. For higher Fe content films a lower growth temperature is necessary to minimize interfacial reactions. Using *in-situ* XPS, only small changes in the valence band are detected for Fe $x \leq 0.15$. Temperature dependent transport reveals thermally activated behavior for $x \leq 0.5$. Ferromagnetism is observed in SQUID magnetometry with a Curie temperature >400K and a saturation magnetization of 3.4 μB/Fe atom formula unit. Ferromagnetic resonance indicates a transition from weak to strong interaction and homogeneity as Fe content is increased.

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