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Muonium in Silicon Germanium Alloys BRENT CARROLL, ROGER LICHTI, Texas Tech University, PHILIP KING, ISIS Facility, Rutherford Appleton Laboratory, GURKAN CELEBI, Istanbul University — We report observations of muonium defect centers in bulk, single crystalline Silicon Germanium alloys. Analysis of both bond-centered and interstitial T-site muonium gives a test for predictions of isolated hydrogen defect levels in $Si_{1-x}Ge_x$ alloys across the full alloy composition range. Temperature dependent amplitudes for neutral Mu_{BC} and Mu_T from high transverse field muon spin rotation (HTF-μSR) measurements yield ionization energies for these muonium centers. The hyperfine parameter for Mu_{BC} varies linearly with alloy composition, whereas for Mu_T it varies non-linearly, perhaps due to faster motion among germanium T-sites compared to silicon. Our HTF-μSR analysis of $Si_{0.16}Ge_{0.84}$ shows that the diamagnetic muonium species grows around 130 K with an activation energy of 102(1) meV. Similar data for $Si_{0.10}Ge_{0.90}$ give an activation energy of 67(3) meV. Both HTF-μSR and RF resonance results show two distinct Mu_T signals for x $\geq$ 0.84. These states are tentatively assigned to T-sites with all Ge neighbors versus those with a Si neighbor.

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