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Mu metal exchage bias[1] PRIYANGA JAYATHILAKA, SCOTT CAMPBELL, CASEY MILLER — The exchange bias of the soft ferromagnet mu-metal, Ni77Fe14Cu5Mo4, with the metallic antiferromagnet Fe50Mn50 has been studied. Two series of multilayer heterostructures were grown with (111) texture induced by different buffer layer materials: Cu(300 A)/Ni77Fe14Cu5Mo4(200 or 400 A)/Fe50Mn50 (100 A)/Cu(300 A) and Ta(50 A)/Ni77Fe14Cu5Mo4(60–400 A)/Fe50Mn50(150 A); control samples were grown without Fe50Mn50. The samples have a clear unidirectional anisotropy induced by depositing in a magnetic field, the exchange bias magnitude is inversely proportional to the mu-metal thickness, and the interfacial coupling energy of 0.045 erg/cm2 agrees with previous results for FeMn antiferromagnets. While the Cu-buffered samples reveal a significant increase in coercivity and saturation field when exchange biased, the Ta-buffered samples retain the soft magnetic properties of the mu-metal simultaneously with the exchange bias. The ability to preserve soft ferromagnetic behavior in an exchange biased heterostructure may be useful for device and sensing applications.

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