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Epitaxial FeMn and (MnCr)(AsBiSb) thin films: MBE growth and magnetic properties

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Antiferromagnetic materials have attracted great attention in technological applications such as spin-valve and MTJ (magnetic tunnel junction) since the discovery of the exchange bias associated with the interface between ferromagnetic and antiferromagnetic materials. Here, we report the new structure of ferromagnetic $Fe_{1-x}Mn_x$ thin films on GaAs(100) substrate by using molecular beam epitaxy (MBE) On the other hand, ferromagnetic semiconductors have attracted great interests because of their potential spintronic device applications. Conventionally, DMS(diluted magnetic semiconductor), which transition metals were substituted into semiconductors such as Ge, Si, Ⅲ-Ⅴand Ⅱ-Ⅵ semiconductors, have been widely studied as a spin injector and/or spin detector. In this talk we report a different approach in making ferromagnetic semiconductor by inserting a monolayer ferromagnetic material between semiconducting layers. We have fabricated 37-period GaSb(25Å)/MnSb(2Å) superlattices on GaAs(001) substrates with 1000 Å GaSb buffer layers. Interestingly, GaSb(25Å)/MnSb(2Å) superlattice showed ferromagnetic ordering up to above 400 K and its coercive field was 380 Oe at 10 K. Also ,we will discuss the structural and magnetic properties (MnCr)(AsBiSb) thin films.