

平成 24 年 9 月 18 日

応用物理学会北海道支部
会員各位

応用物理学会北海道支部講演会のお知らせ

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演題： Epitaxial ferromagnetic Heusler alloys on semiconductor substrates for spin injection

講師： Dr. J. Herfort 氏

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日時： 平成 24 年 9 月 21 日 (金) 11:00～12:00

場所： 北海道大学 情報科学研究科棟 1 階 A12 講義室

主催： 応用物理学会北海道支部

講演の要旨

Ferromagnet-semiconductor heterostructures are expected to offer new perspectives to semiconductor device technology. The Heusler alloy Co_2FeSi is a promising candidate as a spin injection source into semiconductors, because of its high Curie temperature and predicted half-metallic behavior. Co_2FeSi layers with high crystal and interface perfection as well as smooth surfaces can be obtained on GaAs and Si substrates. We have achieved spin injection efficiencies of more than 50% in (Al,Ga)As/GaAs (001) spin light emitting diodes utilizing Co_2FeSi as a spin injector. However, spin injection into such devices exhibit a strong dependence on the Co_2FeSi growth temperature. The key limiting factor of the complex behavior is the interplay between the strong in-diffusion of Co and Fe into the semiconductor part of the device, the chemical reaction at the interface and the long-range atomic ordering of the Co_2FeSi layer adjacent to the interface (which all increase with rising the growth temperature). Moreover, we demonstrate all-electrical injection and detection of spins using lateral spin valves consisting of the Co_2FeSi /GaAs hybrid system in the non-local as well as local configuration.

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