Takashi Kimura, J Material Sci Eng 2015, 4:3
http://dx.doi.org/10.4172/2169-0022.C1.031

OMICS International
conferenceseries.com

International Conference and Exhibition on
Mesoscopic & Condensed Matter Physics
June 22-24, 2015 Boston, USA

Large spin-dependent thermoelectric effects using CoFe-based alloy

Takashi Kimura
Kyushu University, Japan

Manipulation of spin current is a central issue in the operation of spintronic devices because the spin current plays key role in spin-dependent transports and spin-transfer switching. Recently, heat utilization for creating the spin current has been paid considerable attention, leading to an emerging field, spin caloritronics. Various mechanisms for generating spin current utilizing heat such as the spin Seebeck effect, spin dependent Seebeck effect, Seebeck spin tunneling effect and spin heat accumulation have been demonstrated in different device structures. However, the generation efficiencies for spin current were much smaller than that by electrical means, indicating quite far from the practical application. Recently, we have shown that the thermal spin injection efficiency was dramatically enhanced by using a CoFeAl injector because of its favorable band structure. This demonstration may open a new avenue for the utilization of the spin current in the nano-electronic devices. In this presentation, the author will introduce an electrical and thermoelectric property for the excellent material CoFeAl and show that a sign reversal of the Seebeck coefficient between the up and down spins is the key for enhancing the generation efficiency of the spin current. Furthermore, we show that CoFeAl induces a large spin Peltier effect.

Biography

Takashi Kimura is a Research Scientist in the field of spintronics. He got his BEng in Electronics, MEng in Nano-Electronics and PhD from Osaka University. He was a Research Fellowship in Riken and was Assistance Professor in Institute for Solid State Physics, University of Tokyo. Now, he is a Professor for Department of Physics, Graduate School of Sciences and the Director of Quantum Nano-Spin Sciences Research Center, Kyushu University, Japan. He was awarded the IUPAP Young Scientist Metal in the field magnetism 2009.

t-kimu@phys.kyushu-u.ac.jp

Notes: