Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Thermopower measurements of atomic and molecular junctions using microheater-embedded mechanically-controllable break junctions MAKUSU TSUTSUI, TAKANORI MORIKAWA, AKIHIDE ARIMA, MASATERU TANIGUCHI, ISIR, Osaka University — There has been growing interest in developing high-performance thermoelectric materials for realizing thermoelectric power generation. Quantum confinement effects in low-dimensional structures are expected to provide high electronic density of states for enhanced thermopower, and thus considered as a promising approach for achieving a high figure of merit (M. S. Dresselhaus et al., Adv. Mat. 19 (2007) 1043-1053). From this respect, it is interesting to study thermoelectric properties of atomic and molecular junctions and evaluate their potential as a thermoelectric material. Recently, we have developed a heater-embedded micro-fabricated mechanically-controllable break junction (MCBJ) for investigating the thermoelectric transport in single-atom and –molecule junctions. Using the MCBJ devices, we could repeatedly form stable junctions at room temperatures via a self-breaking mechanism with one side being heated by the adjacent microheater. In my presentation, I will show the results of simultaneous measurements of the thermoelectric voltage and the electrical conductance of atom-sized Au junctions and Au-benzenedithiol-Au junctions and discuss on the geometrical dependence of thermoelectric transport.

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Date submitted: 14 Nov 2014 Electronic form version 1.4