

Abstract Submitted
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Current induced local heating and heat transport in single molecular bridge junction YOSHIHIRO ASAI, AIST, Umezono 1-1-1, Central 2, Tsukuba, Ibaraki 305-8568, Japan — Current induced local heating will be discussed theoretically. Both electric conductance and heat conductance of electronic and phonon origins are calculated in a microscopic way, including inelastic scattering effects due to electron-phonon couplings. [1] Based on the self-consistent solution for an alkanethiol molecule bridging gold electrodes, we found that the effective temperature T_{eff} due to the local heating is largely reduced by the heat conductance, which releases the Joule heat out of the molecule. All these calculations are made in a fully microscopic way without introduction of the phenomenological phonon diffusion effect used in literature. Theoretical voltage dependence of T_{eff} agrees nicely with an experiment. [2] Ref.) [1]Y. Asai, Phys. Rev. B78, 045434 (2008). [2] Z.Huang et al, Nano Letters, 6, 1240 (2006).

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