

Comment on "Fabrication of a Molecular Self-Assembled Monolayer Diode Using Nanoimprint Lithography"

Wenyong Wang, Takhee Lee, and Mark A. Reed*

Departments of Electrical Engineering, Applied Physics, and Physics, Yale University,
P.O. Box 208284, New Haven, Connecticut 06520

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A recent paper¹ proposed a fabrication technique utilizing nanoimprint lithography to create nanometer scale structures for the study of the electronic transport properties of self-assembled monolayers (SAMs). Transport results on octadecanethiol SAMs (C-18) were presented as evidence; however, the reported conductivity is 6–8 orders of magnitude higher than those previously observed for alkanethiols by other research groups utilizing various characterization methods.^{2–6} Alkanethiols are large HOMO–LUMO gap (HOMO: highest occupied molecular orbital, LUMO: lowest unoccupied molecular orbital) molecules with very short molecular lengths, thus the conduction mechanism is expected to be tunneling.⁷ To verify a tunneling mechanism, temperature-dependent or length-dependent current–voltage measurements are generally recognized methods^{2,8–10} to eliminate other defect-mediated transport processes. In the recent letter¹ none of the aforementioned characterizations were performed, and thus other non-molecular transport processes (such as filamentary conduction) are possible. The paper's conclusions regarding the

properties of alkanethiol monolayers, and the applicability of the process to study any thiol-based SAMs, are both premature claims. More careful characterization and analysis is necessary to validate these claims.

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* Corresponding author. Telephone: 203-432-4306. Fax: 203-432-6420.
E-mail: mark.reed@yale.edu