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Statistical Analysis of Electronic Transport in Alkanethiol Molecular Devices with Nanowell Structures. HYUNWOOK SONG, TAKHEE LEE, Department of Materials Science and Engineering, Gwangju Institute of Science and Technology, NAK-JIN CHOI, HYOYOUNG LEE, Center for Smart Molecular Memory, IT Convergence Components Laboratory, Electronics and Telecommunication Research Institute — We study charge transport through nanoscale molecular monolayers. For example, alkanethiol $[\text{CH}_3(\text{CH}_2)_{n-1}\text{SH}]$ self-assembled monolayer (SAM) is one of the most standard molecular systems that has been extensively investigated, and is very useful as a control in molecular devices because their structure and configuration have been sufficiently well-characterized. Reported here is a statistical analysis of electronic transport in alkanethiol SAM using different length alkanethiols. Particularly, we fabricated more than 6,000 molecular devices with nanowell structure, a vertical type of metal-molecule-metal junctions with nanometer scale junction diameter. We investigated transport properties such as temperature-variable current-voltage $I(V,T)$ characteristics from these mass-fabricated devices. Based on the extensive $I(V,T)$ data, a statistical analysis of transport characteristics in alkanethiol SAM will be presented.

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