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Lateral Strain Sensing Characteristics of Carbon Nanotube Network Thin-Films on Flexible Substrates

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Recently, it has been reported that lateral strain applied to carbon nanotube networks results in change in the network conductivity. Since the conduction mechanism within the nanotube network is by percolation, a detailed investigation on the inter-network conductivity of carbon nanotube networks depending on nanotube density should be made for possible application of carbon nanotube networks to strain sensors. Here, we investigate the external strain dependent conductivity of single walled carbon nanotube networks (NTNs) formed on a stretchable silicone elastomer surfaces. The NTN was formed using vacuum filtration, and transferred to the poly-dimethylsiloxane (PDMS) by directcuring. We measured the change in NTNconductivity depending on the sample elongation and found 24 % strain applied to the PDMS results in ~10 % reduction in NTN conductance and even a 0.05% deformation was detectable. We will present strain dependent conductivity results on samples with different nanotube densities.