

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Ultra high Transparent and Conductive Electrodes Based on As-Grown SWNT with Metallic Conductivity TEREZA PARONYAN, ELENA PIGOS, GUGANG CHEN, AVETIK HARUTYUNYAN, Honda Research Institute USA Inc., Columbus, OH, 43212, USA, HONDA RESEARCH INSTITUTE USA INC. TEAM — Carbon based materials have been proven to be a unique material for transparent conducting films, with potential for application on liquid crystal displays, touch screens and solar cells. We successfully grew SWNT films by Chemical Vapor Deposition method using Fe nanocatalysts on quartz substrates. The ratio of semiconductor/metallic nanotubes varied depending on the treatment conditions of the catalyst nanoparticles, according to Raman analysis. SEM analysis of the samples revealed homogeneous coverage of the quartz substrates by SWNTs, which exhibit transparencies higher than 98%. Sheet resistance measurements of these SWNT films, by Van der Pauw method, demonstrated the correlation between the conductivity and the abundance of semiconductor and metallic nanotubes in the films. Increasing the content of metallic SWNTs in the film up to 90% decreased the sheet resistance down to 4-5 $K\Omega$ /, while maintaining a high transparency of over 98%. For comparison, transparent electrodes based on high quality monolayer graphene sheets were also fabricated. The conductivity and transparency of the electrodes of as grown SWNTs were comparable to the electrodes based on monolayer graphene.

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Date submitted: 29 Nov 2011

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