Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

**Positive impact of agglomeration in nanocomposite conductivity**[1]

TAYLOR TARLTON, ETHAN SULLIVAN, Louisiana Tech Univ, PEDRO DEROSA, Louisiana Tech Univ/Grambling State Univ — CNTs are embedded in an insulating matrix to form composites to improve its mechanical, thermal and electrical properties. However, CNTs tend to clump together forming agglomerates and thus Experimental studies on CNT composites normally describe significant effort in dispersing CNT for a more effective performance. Although the main concern is on the impact agglomeration has on mechanical strength, it is accepted that agglomeration will also negatively affect conductivity. In this workg computer simulations are used to study this effect in detail and it is found that some level of agglomeration actually improves conductivity by a better use of the available volume. Agglomerates leave voids in the sample in favor of other areas where the CNT-CNT distance is smaller than it would be if their distribution were uniform thus improving conductivity. More uniform samples have more conduction paths, but CNT-CNT distance is in average larger leading to a lower mobility. The opposite happen when some agglomeration is present and thus there is a tradeoff that above, but near, percolation leads to higher conductivity in the case where some agglomeration is present. At higher concentrations, the effect of mobility seems to be larger as there are enough conduction paths already available.

[1]This work is supported by Air Force Research Collaboration Program; contract FA8650-13-C-5800 from the Air Force Research Laboratory,

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Date submitted: 06 Jan 2017 Electronic form version 1.4