ABSTRACT

Nanotube suspensions have been modeled via Monte Carlo simulation. A computer model was used to realize networks of nanotubes with random placement and orientation. The nanotubes were modeled as capped interpenetrating cylinders placed in a unit volume. The problem was formulated as a percolation process, where the critical fractional volume (CFV) of cylinders (associated with the onset of percolation) was realized multiple times and analyzed. The aim of the study was to consider nanotubes of high aspect ratio, (*a*=length/diameter; as high as 2000), and to determine the effects that aspect ratio may have on the CFV. It was determined that the CFV is inversely proportional to the aspect ratio in the limit of high aspect ratios. This results in the need for very low percent volume loadings *a*()%01.0%≤*volume* of nanotubes to create a conductive network (percolation infinite cluster). These findings are in good agreement with recent experimental data involving the thermal conductivity of carbon nanotube suspensions.