## **Electric Field-Controlled Performance of Fluid-Filled Carbon Nanotubes**

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The water-filled carbon nanotubes (CNTs) have been successfully observed and extracted in laboratories, which have great potential applications and attracted much attention. In this work, we studied the mechanical property of the water-filled CNTs under an external electric field by molecular dynamics simulations. The results reveal that the elastic property of the water-filled CNTs can be enhanced through applying the electric fields, and the average post-buckling stress can make a clear response to the electric field intensity. For the pre-strained water-filled CNTs, the height can be stretched as the electric field intensity increases. These phenomena are ascribed to the structural configuration of water molecules under an electric field. The present findings provide a valuable reference for designing and fabricating the controlling units at nanoscale. Supports from the NSFC (11302037, 11272003 and 11232003), the 973 Program (2010CB832704) and the NCET of Ministry of Education (NCET-13-0088) are gratefully acknowledged.

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