# Finite element analysis for the separation of single-wall carbon nanotubes by dielectrophoresis

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Since the discovery of single-wall carbon nanotubes (SWNTs), there have been numerous researches on them due to their remarkable electrical and mechanical properties. However, metallic SWNTs are mixed with semiconducting SWNTs in the product of growth process, so separation method is needed to use them for different applications. Dielectrophoresis (DEP)-induced separation technique is a candidate for the separation of SWNTs without chemical modification. The magnitude of DEP force strongly depends on gradients of electric field influenced by electrode design as well as permittivity and conductivity of SWNTs. We have investigated effects of curvature of electrodes which provides maximum DEP force and then predicted motion of SWNTs in the vicinity of the electrode due to the DEP force by finite element analysis. Here, electric fields over whole domains were solved based on the Poisson's equation and DEP force applied on SWNTs has been calculated. The simulation result shows that electrodes having curvature are more efficient than those without winding. This study will be used to fabricate novel optimized design of electrodes in DEP separating methods.