Nanotechnology and nanomaterials

Surface charge density of pristine and oxidized carbon nanotubes in dependence on the electrolyte type and concentration

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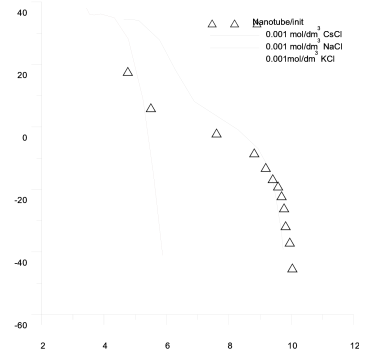
Carbon nanomaterials have a large surface area and complex particle's shape architecture. These qualities are successfully applying to develop new drug carriers, fillers or nanodetectors. At the same time, the utilisation efficiency of such materials is caused by maintaining of the nanodispersity. The stability of the nanotubes dispersion mostly depends on uniformity of the boundary layer and nanotubes morphology. The hydrophobic nature of defectless areas of their surface and the hydrophilicity of some type of defects in the nanotubes boundary layer, namely carboxy- or phenolic groups which are formed during nanotubes purification and washing, are competes during dispergation in the water media. An increase of stability of the nanotubes dispersion in water can be achieved through the change of the surface charge via formation of the double electrical layer (EDL). This work is devoted to investigation of surface charge density of multivalued carbon nanotubes at different ionic environments. The measurement of surface charge density was performed using nanotubes produced by the Chuiko ISC (UKRAINE) in NaCl, KCl, CsCl or $NaClO_4$ solutions with concentration of 0.1, 0.01 and 0.001 mol/l correspondingly.



Was shows that the magnitude of the charge on the surface of the nanotubes is caused by pH of the solution and increases in the alkaline range. With the cation size increasing the surface charge become more positive.

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