INVESTIGATION OF RHEOLOGICAL BEHAVIOR OF POLYMERIC NANOTUBE AGGREGATE SUSPENSIONS

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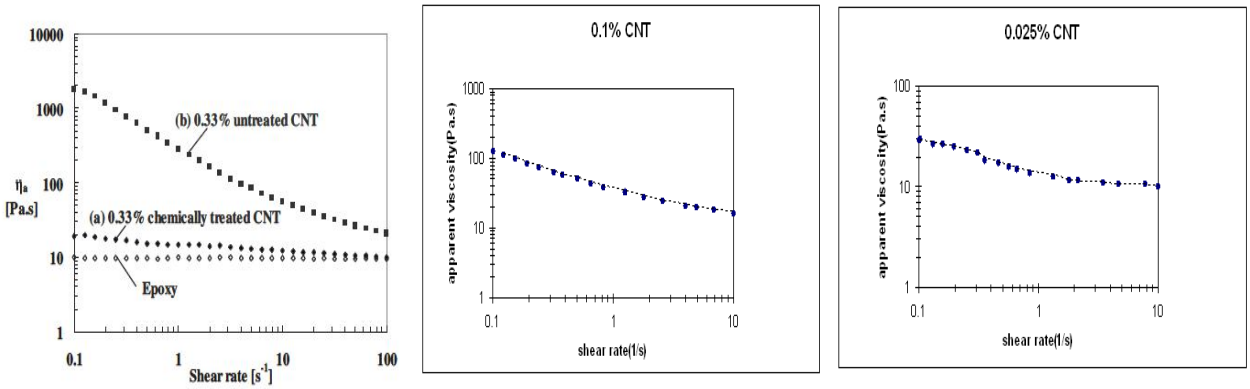
A survey on the rheological modeling of untreated carbon nanotubes (CNTs) suspended in a Newtonian epoxy resin is presented. The untreated CNT suspension shows shear-thinning behavior. Rheological behavior of polymeric suspensions is fitted on Fokker-Planck orientation model. Despite of succession in predicting the rheological response of treated CNT in steady shear flows, the orientation model (Fokker-Planck) failed to explain the more pronounced shear-thinning effect observed in untreated CNT suspensions with a hierarchy of aggregate structures. Rheological behavior of treated and untreated CNT suspensions has been found to be significantly different particularly in relation to shear thinning. In general, untreated CNT suspensions show a much higher level of observable optical microstructure that reflect their preference to aggregate; they also show higher levels of viscoelasticity over treated CNT suspensions. The new model involves two elements: Orientation and aggregation. Finally the new model is tested against the experimental data (Iranian Polymer melts with Anton Paar Rheometer), and with use the number of adjustable parameters is fitted with them.



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