ASSESSING EFFECTIVENESS AND ADHESION OF NANOREINFORCEMENTS IN POLYVINYLBUTYRAL BY DYNAMIC-MECHANICAL ANALYSIS

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Abstract: Dynamic mechanical analysis (DMA) is extensively used to evaluate the stiffness and damping properties of composite materials. Moreover, structural and viscoelastic behavior studies of polymer materials are used for industrial applications. DMA, in addition to the determination of glass transition temperatures and variation of viscoelastic parameters with temperature and frequency, can also be used to assess the entanglement density, adhesion, and reinforcement effectiveness for micro- or nano-composites. In this work we present the application of the equations proposed by S.Thomas and coworkers to calculate the 'C' factor, which indicates the reinforcement effectiveness of the filler, the degree of entanglement and the adhesion factor for different nanoreinforcements (graphene nanoplatelets, carbon nanotubes and zinc oxide nanofibers) in a thermoplastic matrix (polyvinylbutyral). The results are correlated with morphological (transmission and scanning electron microscopies) and spectroscopic (Raman, FTIR, NMR and XRD) measurements.