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On the Miscibility of Polymer / Layered Silicate Nanocomposites

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Greece, E.P. GIANNELIS, Cornell University, Department of Materials Science and
Engineering, U.S.A. — In the present work we attempt to control the structure in
polymer / layered silicate nanocomposites by understanding and / or altering the
interactions between the chains and the surfaces. In this respect, hydrophilic and
organophilic systems have been utilized and the final structure of the composites
is characterized by X-Ray Diffraction and Transmission Electron Microscopy. The
effect of the solvent quality on the final structure, in the case of solution mixing,
has been examined and the results are compared with the respective obtained from
melt intercalation whereas the role of the chemical structure or of the different glass
transition temperature of the polymer has been evaluated. In the case of very im-
miscible systems like for example polyolefin/silicate composites the effect of a more
polar additive has been examined. Phase separated up to exfoliated structures can
be obtained in a controlled way by varying the compatibilizer to organoclay ratio.
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