



Chapter 2 - Polymer–Polymer Compatibility

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Publisher Summary

This chapter provides an overview of polymer-polymer compatibility. The term "polymer compatibility" refers to the total miscibility, on a molecular scale, of homo-polymers and of random copolymers with each other in various combinations. In the chapter, no distinction is made between polymers in the rubbery or glassy state. The chapter discusses the crystallizable polymers in which the polymer remains at least partially amorphous and in which the miscibility with other polymers are investigated in the amorphous state. The chapter briefly reviews methods for predicting compatibility and presents a method for predicting compatibility along with its limitations. It explains the prediction schemes for polymer-polymer compatibility. The experimental methods for determining solubility parameters of polymers involve studies of the polymers in solution or swollen by solvent, that is, the thermodynamics of the situation involves the entropy contribution to the polymer-solvent interaction parameter and it complicates the theoretical treatment. It often turns out that experimental solubility parameters for the same

polymer vary a great deal, depending both on the method used and on the experimenter. The two methods used are (1) swelling of a cross-linked polymer, where it is assumed that the solubility parameter of the polymer is equal to that of the solvent which swells it most highly and (2) intrinsic viscosity of a soluble polymer sample, where the solubility parameter of the polymer is equal to that of the solvent in which its intrinsic viscosity is greatest. For the same polymer, these methods often give different results depending on the nature of the solvents, which may be non-polar, polar, or hydrogen bonding.