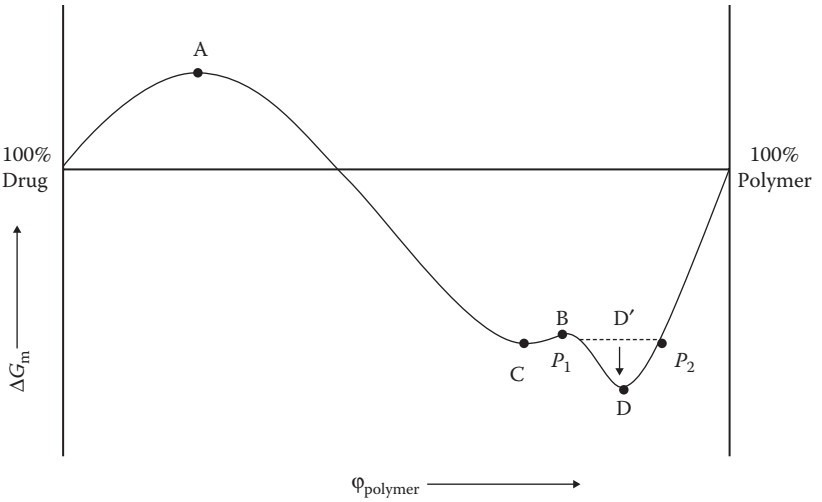

FIGURE 18.2 Hypothetical depiction of drug–polymer miscibility by plotting changes in free energy of mixing (ΔG_m) as a function of volume fraction of polymer ($\varphi_{polymer}$). At composition given by point A, no drug–polymer mixing occurs as $\Delta G_m > 0$. At point B, although drug–polymer mixing occurs, a phase separation into points C and D is possible since composition at these points have lower free energy than at B. Mixture at point D has the lowest free energy than any other points of the same overall composition. If the system hypothetically phase separates into two points (e.g., P_1 and P_2), the composition weighted free energy (given by point D′) is higher than D, hence the system would thermodynamically revert to composition depicted by point D. (Reproduced from Coleman, M. M. et al., *Specific Interactions and the Miscibility of Polymer Blends*, Technomic Publishing Company, Lancaster, PA, 1991.)

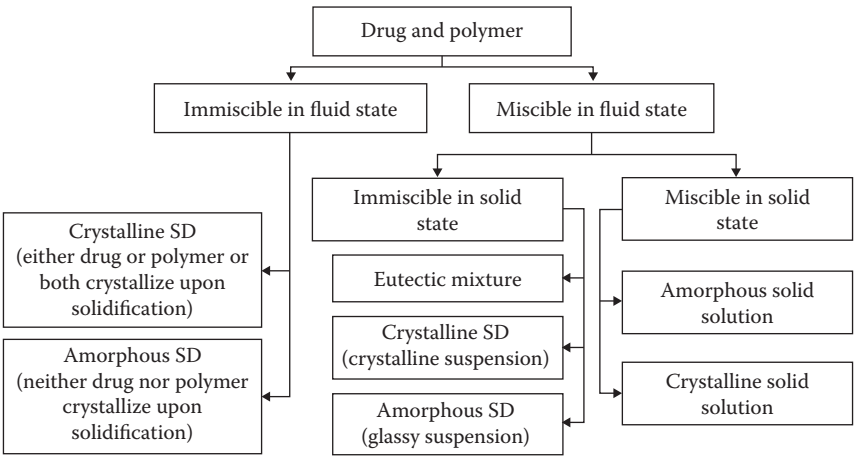

FIGURE 18.3 Flowchart describing the various types of solid dispersions depending on whether the drug and polymer are miscible in their fluid state and solid state.

Drug and Polymer Exhibiting Immiscibility in Fluid State

If a drug and polymer are immiscible in their fluid state, it is likely that they would not exhibit miscibility on solidification of the fluid mixture. Such systems may be regarded as similar to their corresponding physical mixtures, although any enhancement in dissolution performance compared to physical mixture may be owing to modification in morphology of drug and/or polymer due to