



Figure 9.13 Idealized phase behavior representing how addition of component C to an equal mixture of A to B (point x) will cause an equal increase in the volumes of phase A and phase B until a critical point is reached (●), and the interface between the two approximately equal-volume phases disappears, resulting in a single-phase sample.

water-sodium cholate-*lecithin* is shown in Figure 14 (11). Although the structure and characteristics of surfactant liquid crystalline phases are outside the scope of this chapter, it is sufficient to state that liquid crystals are thermodynamically stable regions, single-phase, and reversible in their formation relative to temperature. Various texts describe the surfactant systems in detail (7,10). For the water-sodium cholate-*lecithin* system, the mixed micellar region has been used to solubilize vitamin E to form an injectable sterile solution (12). The liquid crystalline regions, especially the cubic phase, are stiff phases that are characterized by slow diffusion of incorporated materials. Similar cubic liquid crystals have been patented for use as sustained-release vehicles (13).

When considering three-component systems not consisting of pure materials, tie lines are no longer reliable, and considerably less in-