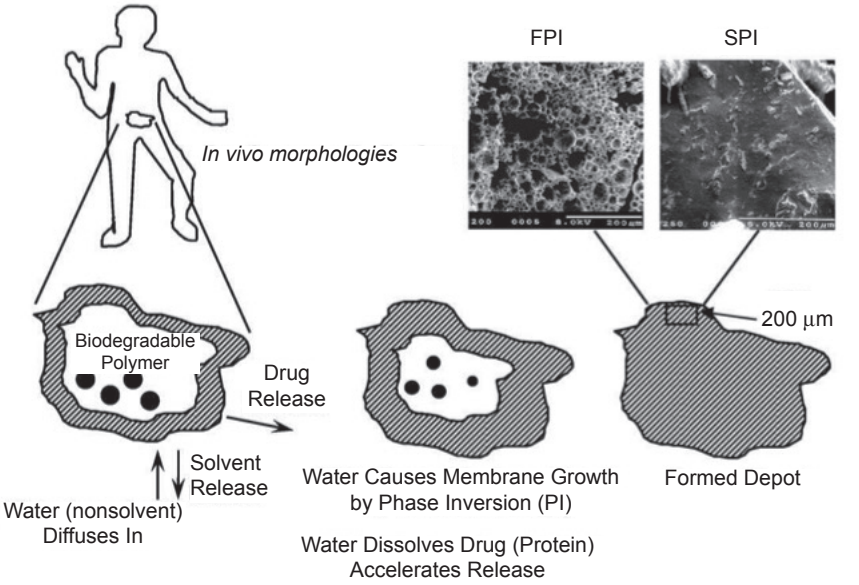

Fig. 1. Schematic illustration of membrane formation/drug release in an injectable system. Morphologies in upper right show fast phase inversion (FPI) and slow phase inversion (SPI) hardened membrane structures (McHugh 2005).

2.3.2 Slow Phase Inversion (sPI)

These systems undergo phase inversion at a slow rate (from hours to days) (McHugh 2005). Solvents used in sPI are weaker and are hydrophobic in nature. Therefore gelation/implant formation occurs at a slow rate. In contrast to the fPI, the implant conformation can be described as being uniformly dense with a limited number of pores (McHugh 2005; Raman and McHugh 2005; Chitkara et al. 2006) (Fig. 1). The limited pores resulted in slower drug release from these implants than that from fPI implants but burst release is highly reduced. The extended period of time for solidification of implant formation is not ideal. The viscosities of sPI solutions are usually of an order that makes injection difficult unless the system is pre-emulsified or preheated to 37ºC (Raman and McHugh 2005). These systems have an inherent disadvantage in relation to drug delivery as the hydrophobicity of the solvent can result in foreign protein adhesion to the implant surface and therefore inhibition of drug release (McHugh 2005).

3. Drug Release from SPI Hydrogel Implants

Depending on the solubility of a drug, it can either be dissolved or dispersed in the polymer solution therefore this method of delivery via injection is appealing for a wide variety of drugs. Drug is entrapment within the polymer matrix occurs when the phase inversion takes place to form a solid implant, allowing release to be controlled