



Fig. 7. Chemical structures of some pH-sensitive polymers: (a) poly (acrylic acid); (b) poly (methacrylic acid); (c) poly (2-ethyl acrylic acid); (d) poly (N,N-dimethyl aminoethyl methacrylate); (e) poly (N,N-diethyl aminoethyl methacrylate); (f) poly (vinyl imidazole); (g) alginate; (h) chitosan.

pH-sensitive system can be applied to the delivery of bioactive agents to any site in the body. pH-triggered phase transition between soluble-insoluble mainly occurs via the protonation-deprotonation of ionisable groups around the pK_a value. pH-sensitive polymers are usually weak polyelectrolytes based on either acidic moieties such as carboxylic acid, sulfonamide or basic tertiary-amine groups that ionise at high or low pH, respectively (Fig. 7).

Ionic crosslinking

Ionic crosslinking is one of the methods used to crosslink ionisable polymers using di- and/or tri-valent cations (Fig. 8). Commonly used polymers are alginate and pectin, where divalent metal ions such as Ca^{2+} are used to cross-link anionic chains of polycarboxylates (Atala et al. 1993; Munarin et al. 2011). The polymeric solution