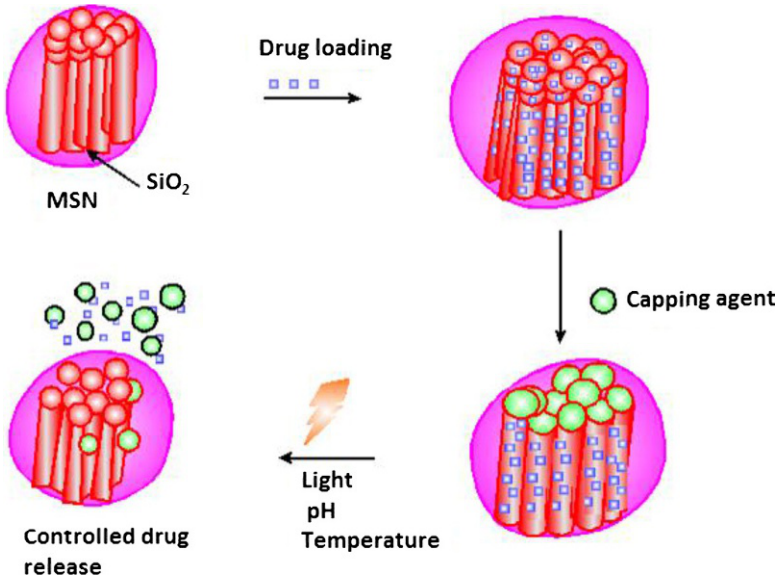

FIG. 19.7 Drug release in MSNs.

silica dissolved at a faster rate than all-silica particles. Onida et al. studied the effect on structural parameters of MSNs having particle size in the range of 200–800 nm during immersion in simulated body fluid (SBF). They reported rapid decrease in mesopore volume during initial hours of immersion, due to redeposition of dissolved silica in the vicinity of mesopore openings gradually closing the pores. This theory was supported by results of drug-release kinetic measurements, which indicated that rate of drug release reached a plateau corresponding to the time at which mesopore volume was strongly reduced.

19.5.1.2 MSN Dispersability

As discussed earlier, a major challenge associated with MSNs is suspension stability as well as particle dispersability and this becomes more dominant with decreasing particle size. The surface layer of MSNs has high concentration of silanol groups in the absence of thermal treatment and subsequently formation of siloxane bridge (Fig. 19.8) between the particles takes place during the process of drying, which makes redispersability a challenge.

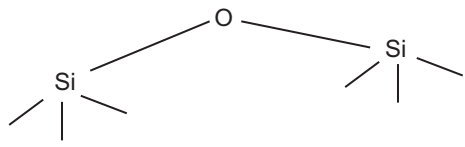

FIG. 19.8 Siloxane bridge.