



FIG. 19.3 Synthesis of nanophasas with raspberry-like (RB) or stellate (ST) channel morphologies at low or high SOA concentration.

and 3–10 nm diameter. Zhang et al. (2008) reported a new sol-gel templating technique to synthesize pure and redispersible monodispersed porous nanophasas with small pore sizes. As shown in Fig. 19.3, nanophasas with raspberry-like (RB) or stellate (ST) channel morphologies were produced using small organic amines (SOAs) as mineralizing agent and CTAB as templating surfactant. At ultralow SOA concentrations bromide (Br⁻) favored RB and Tosylate (Tos⁻) favored ST morphologies, whereas when used together at high SOA concentrations both anions Tos⁻ and Br⁻ yielded a WO morphology, as shown in Fig. 19.3. This entire process is based on ion competition and self-assembly at the electrical palisade micelles.

19.3 ROLE OF ADDITIVES AND REACTION CONDITIONS ON MESOPOROUS SILICA PARTICLES

19.3.1 Vesicular Mesoporous Silica

Synthesis of silica vesicles and their morphologies are greatly influenced by the nature of additives used. An additive could be a molecular organic compound such as ethers, hydrophobic additive, or alcohols, which influence assembly and transformation of vesicular mesoporous silica. Zhou et al. (2007, 2011) utilized hydrophobic additive 1,3,5-triisopropylbenzene (TIPB) along with P123 surfactants through hydrolysis and TEOS condensation to create a multilamellar vesicle template, which was used for synthesis of highly regular vesicle-like silica consisting of alternate concentric shells and voids. The morphology of