Supplementary information:

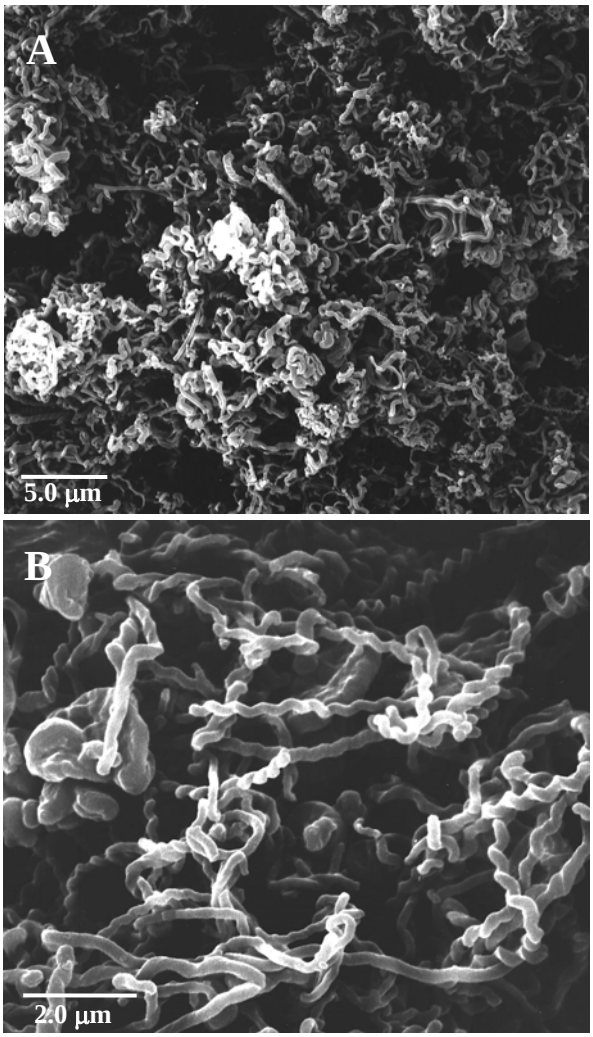

Figure S1. SEM images of the mesoporous silica helical fibers synthesized with C_nTMAB-SDS-P123 template in an acidified silicate solution at pH ≈ 1.5–2.0. A. n = 16; C_{16}TMAB/SDS/P123 in weight = 1.0 g: 0.15 g: 0.02 g; B. n = 14; C_{14}TMAB/SDS/P123 in weight = 1.0 g: 0.135 g: 0.01 g.

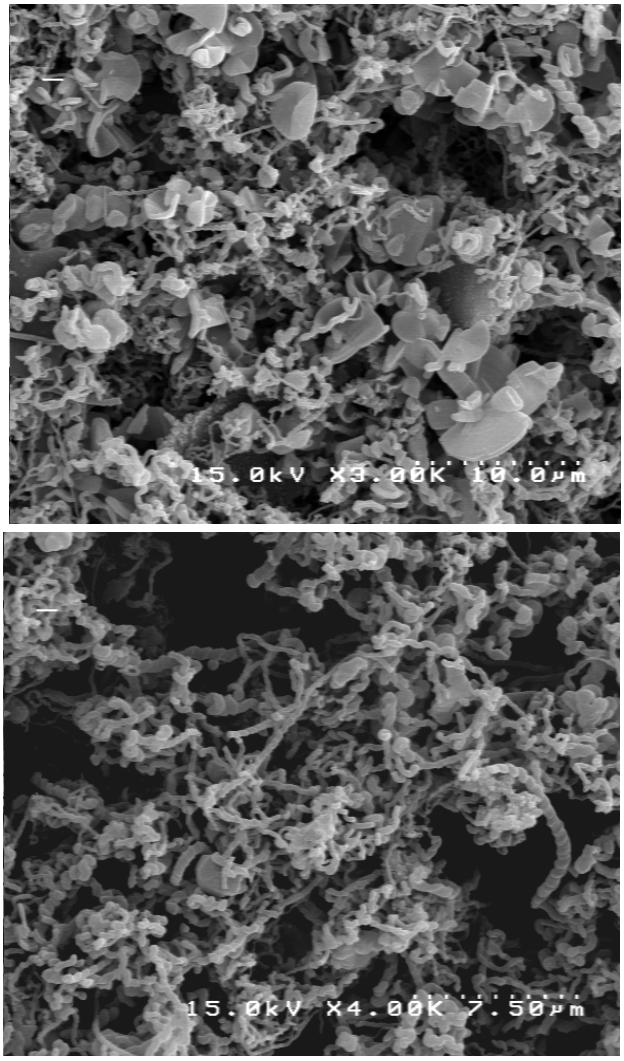

Figure S2. SEM images of mesoporous silica helical fibers synthesized with C_{18}TMAB/SDS/P123 template (Composition: 1.0 g : 0.135 g : X g in weight ratio) at pH = 2.5. A. X = 0.0 ; B. X = 0.075.

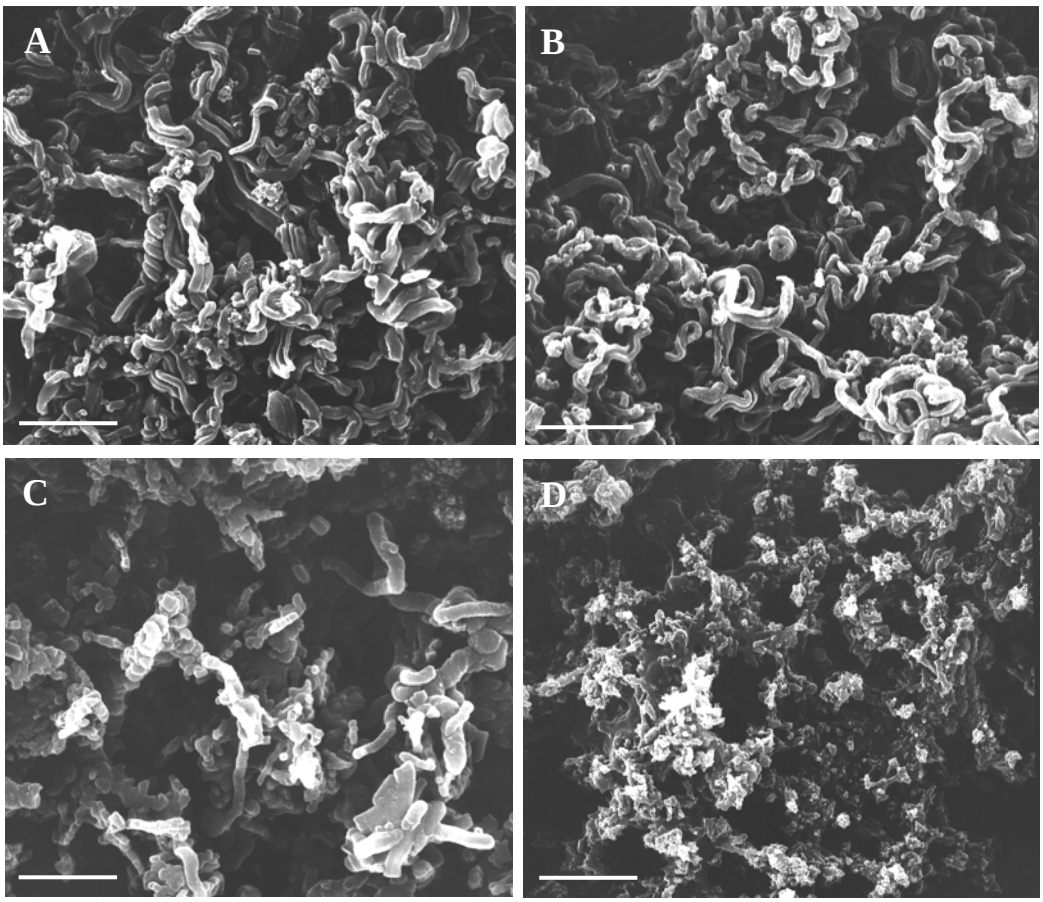

Figure S3. SEM images of mesoporous silica samples synthesized with C_{18}TMAB/SDS/P123 template (Composition: 1.0 g : 0.135 g : 0.01 g in weight ratio) at different pH values. A. pH = 0.5; B. pH = 1.0; C. pH = 3.0; D. pH = 4.0. Scale bars indicate 2.0 μm.

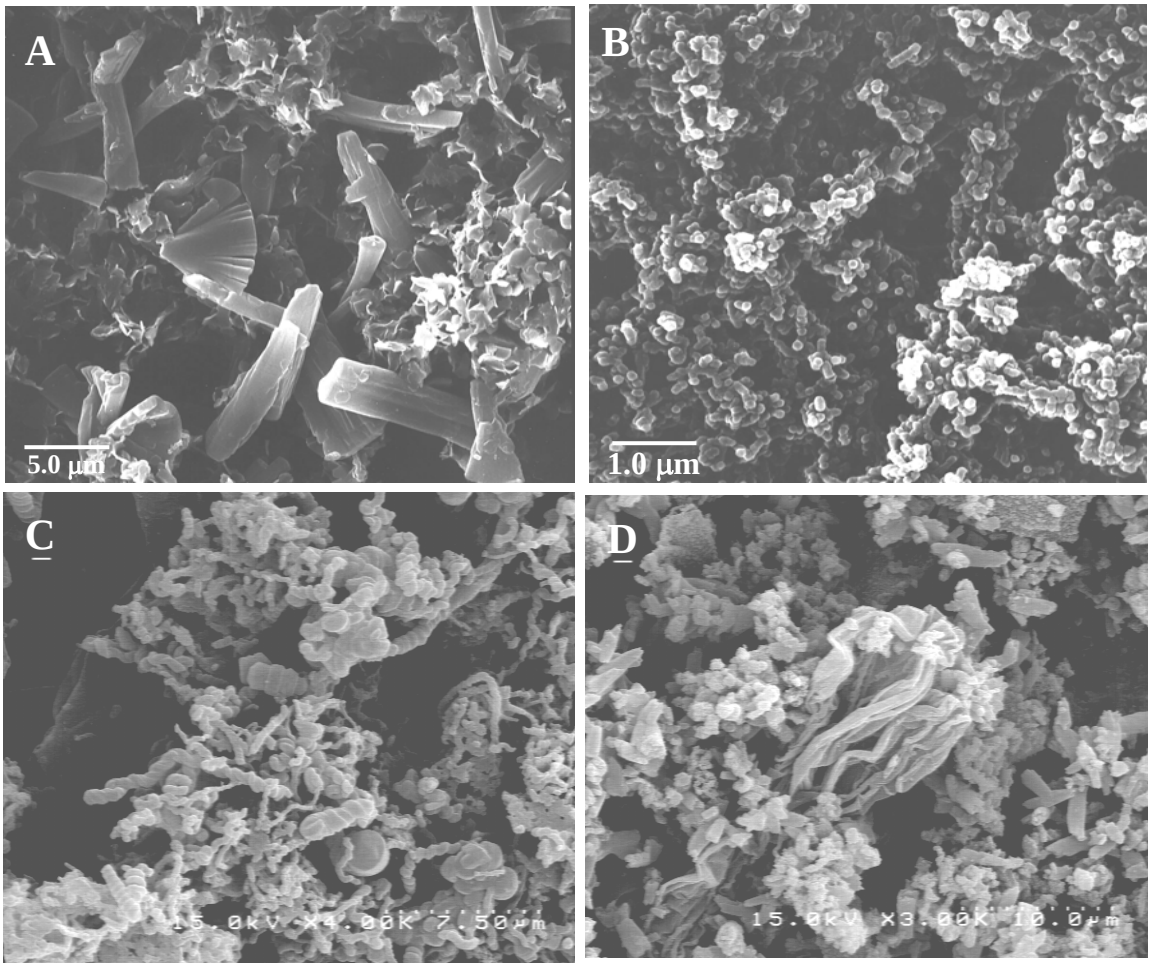

Figure S4. SEM images of mesoporous silicas synthesized with C_{18}TMAB/SDS/P123 template (Composition: 1.0 g : 0.135 g : 0.01 g in weight ratio; pH = 2.5) at different temperature and water content. A. T = 40 ^{o}C; B. T = 100 ^{o}C; C. Water content = 200 g; D. Water content = 400 g.

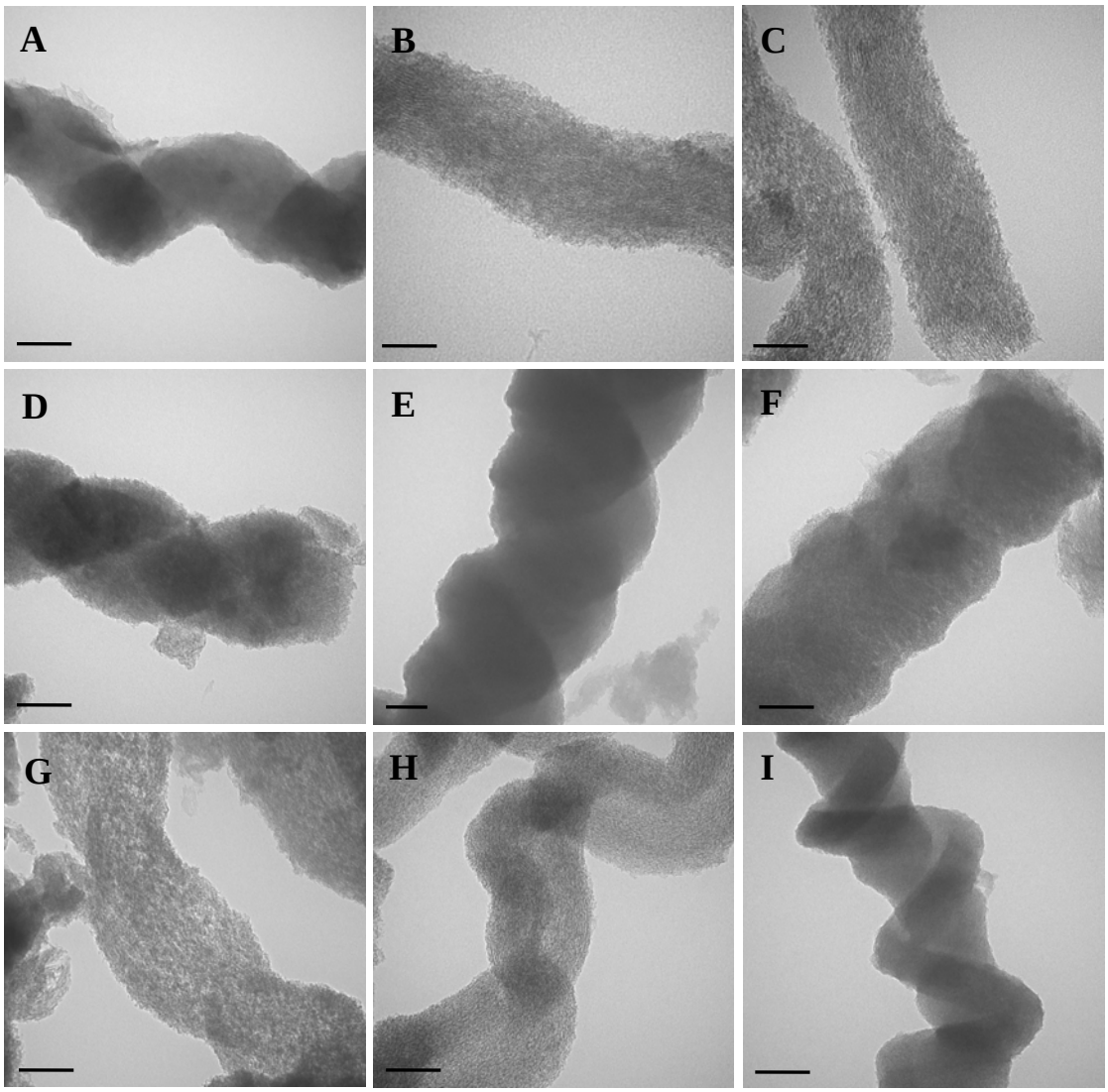

Figure S5. TEM images of various shapes of mesoporous carbon helical fibers after impregnation PF resin, pyrolysis at 1000 oC and HF-etching. (A) Single helix (B) multiple helical nanochannels strains (C) multiple helical nanochannels strains. (D) Double helix (E) Double helix (F) Double helix (G) Double helix ribbon (H) Double stain of single helix (I) Triplet helix (one helix winds around double helix) Scale bars = 100 nm.