Electronic Supplementary Information for

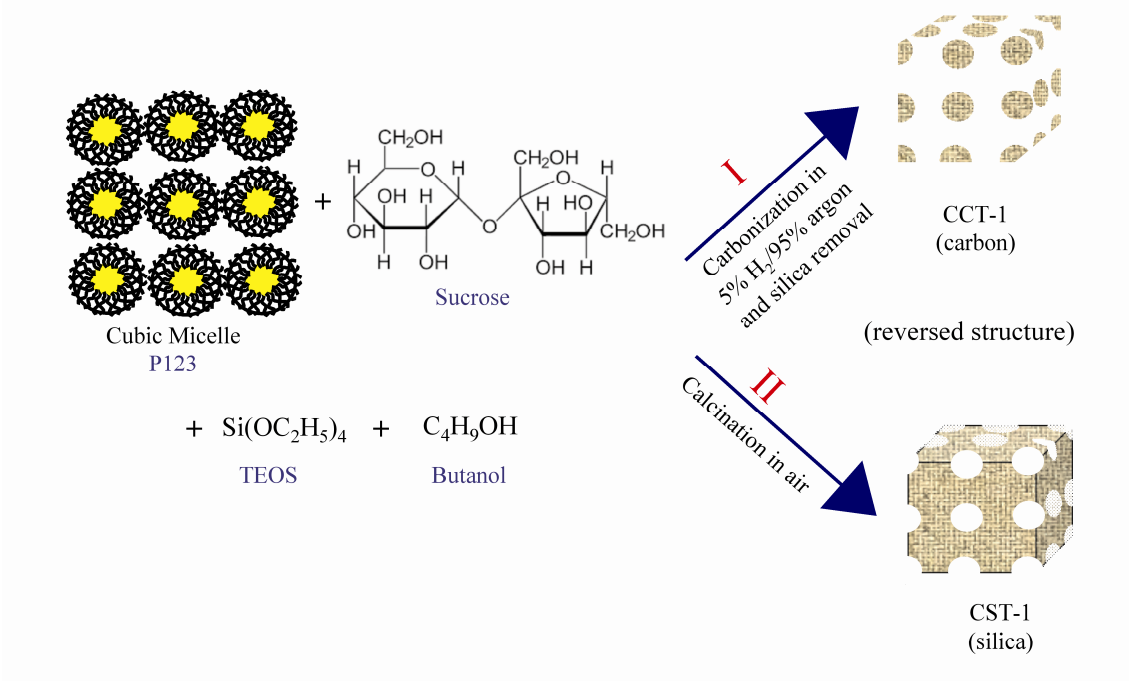
A one-pot organic-inorganic co-assembling route to ordered mesoporous carbons with cubic and bimodal pore structures

*Chun-Chiang Ting, Yu-Chi Pan, Shanmugam Vetrivel, Diganta Saikia, and Hsien-Ming Kao**

Department of Chemistry, National Central University, Chung-Li, Taiwan 32054, R.O.C.

Experimental

Well-ordered CCT-1 and CST-1 samples were synthesized from the as-synthesized composite consisting of silica, sucrose, and P123 under acidic conditions. The molar ratio of synthesis compositions were in the range of P123/H_2O/HCl/BuOH/sucrose/H_2SO_4/TEOS = 1/11600/313.8/78.3/0-10.3/59.9/14.5. In a typical synthesis with a sucrose/P123 ratio of 1.8, 2 g of P123 (Aldrich) was dissolved in 72.0 g of distilled water, 2 g of butanol (Aldrich, 99.4%) and 3.9 g of HCl (35%) under stirring at 35°C. Afterwards, 0.21 g of sucrose (Riedel-dehaen) was added and continuously stirred for another 60 min, followed by the addition of 4.3 g of TEOS (Aldrich). The resultant solution was kept at 35 °C for 72 h under stirring (600 rpm) condition. Afterwards, 0.5 g of H_2SO_4 (Aldrich) was added into the solution and kept stirred for another 60 min at 35°C. Then, the reaction mixture was aged at 100°C for 24 h under static conditions. The resultant mixture was then dried in an oven at 100°C for 24 h and then at 160°C for another 24 h. The color of the sample turned to dark brown or nearly black. The as-synthesized silica/P123/sucrose composite was then carbonized under a 5% H_2 in an argon atmosphere either at 600 or 900°C for 12 h to achieve complete carbonization. The dissolution of silica was achieved using 1 M NaOH solution in a 50:50 mixture of H_2O and ethanol at 65°C for 24 h. The template free carbon product was filtered, washed with water and ethanol and finally dried at 70°C. The resulting mesoporous carbon was labeled as CCT-1. Meanwhile, the as-synthesized silica/P123/sucrose composites were calcined in air under static conditions at 550°C for 6 h to produce the pure mesoporous silica sample, which was denoted as CST-1.



Scheme S1 Schematic representation for the formation of cubic mesoporous carbon (CCT-1) and silica (CST-1) materials via the organic-inorganic co-assembly route.

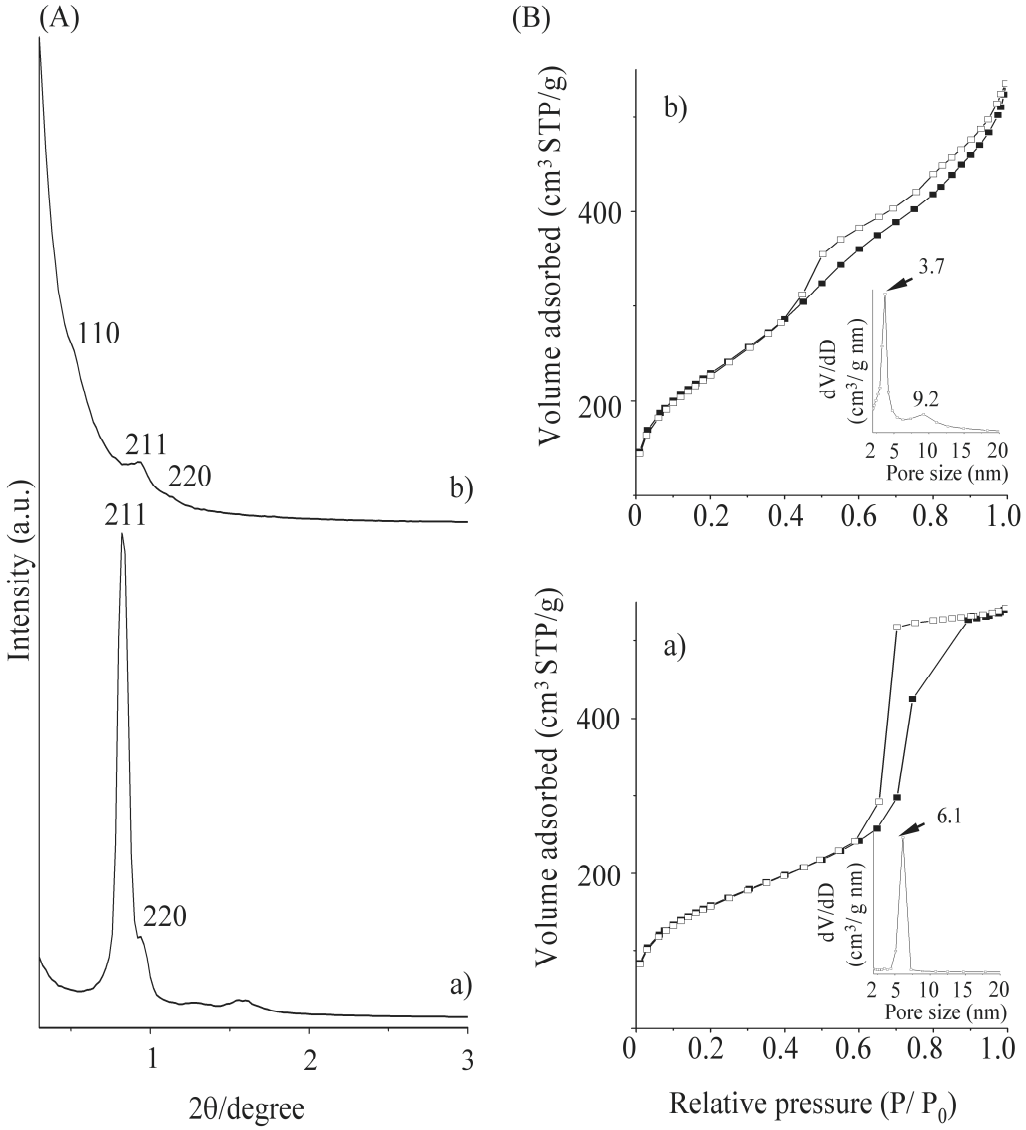


Fig. S1 (A) Powder XRD patterns of a) calcined CST-1 and b) CCT-1 carbonized at 900°C, synthesized with a sucrose/P123 molar ratio of 1.8, and (B) their corresponding N_2 adsorption-desorption isotherms and pore size distributions.

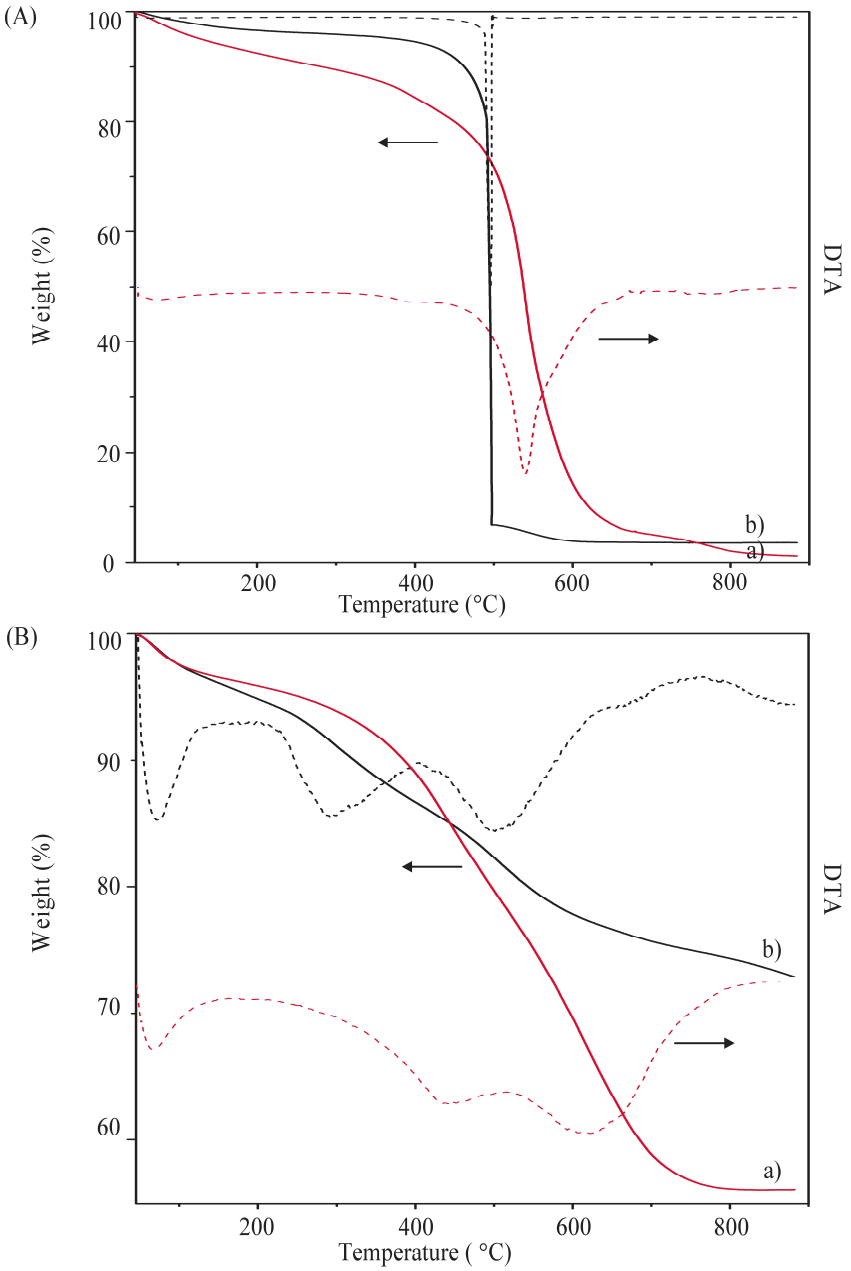


Fig. S2 TGA (solid line) and DTA (dash line) of (A) CCT-1 under an air atmosphere and (B) as-synthesized composite under an N_2 atmosphere. These samples were prepared with a sucrose/P123 molar ratio of a) 1.8 (in red) and b) 0 (in black).