Supplementary Materials: Well-Shaped Sulfonic Organosilica Nanotubes with High Activity for Hydrolysis of Cellobiose

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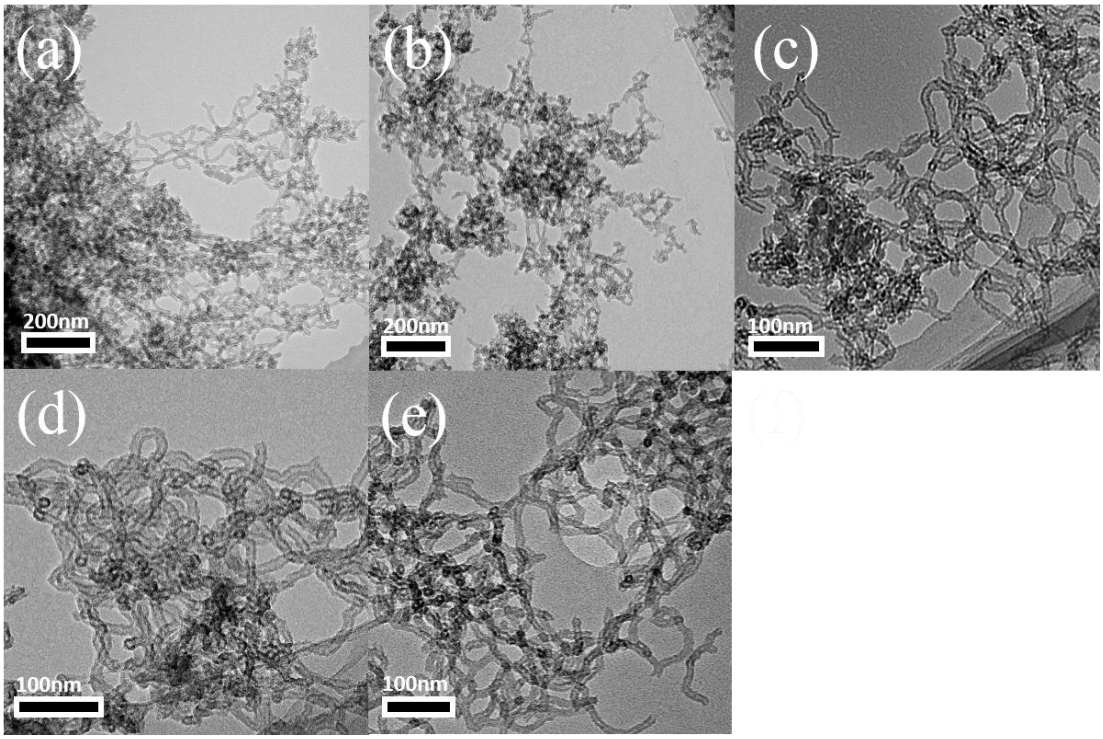

Figure S1. TEM images of mercaptopropyl organosilica nanotubes with different sulfur contents. (**a**) $SH_{0.2}$-Et-SNT; (**b**) $SH_{0.3}$-Et-SNT; (**c**) $SH_{0.1}$-Ph-SNT; (**d**) $SH_{0.2}$-Ph-SNT and (**e**) $SH_{0.3}$-Ph-SNT.

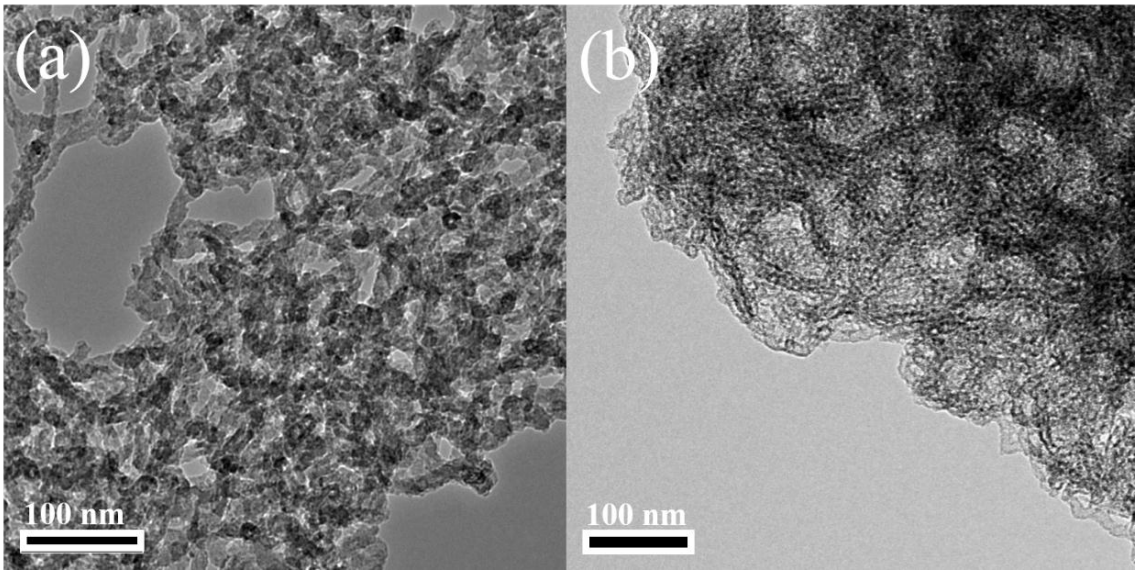

Figure S2. TEM images of (**a**) $SH_{0.5}$-Ph-SNT and (**b**) SH-SNT.

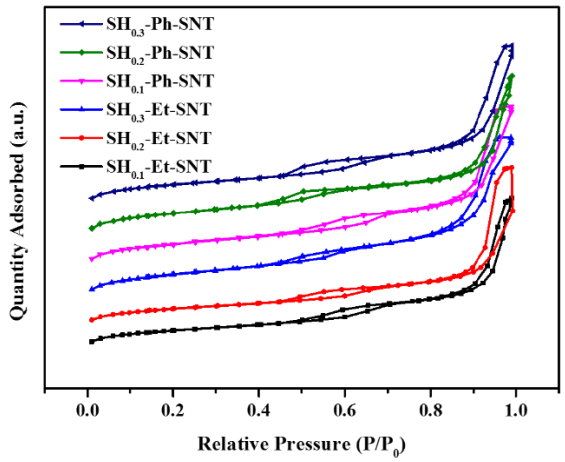

Figure S3. Nitrogen adsorption-desorption isotherms of $SH_{0.1}$-Et-SNT, $SH_{0.2}$-Et-SNT, $SH_{0.3}$-Et-SNT, $SH_{0.1}$-Ph-SNT, $SH_{0.2}$-Ph-SNT and $SH_{0.3}$-Ph-SNT.

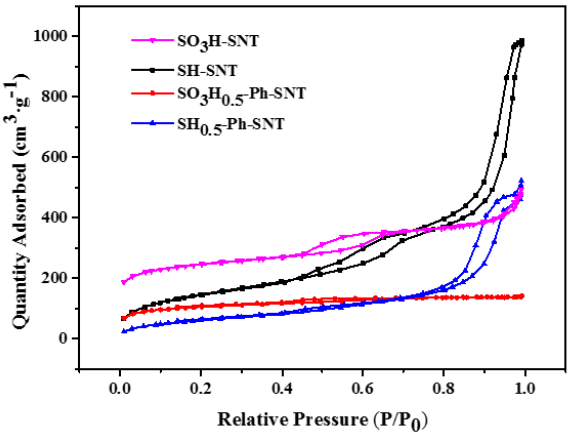

Figure S4. Nitrogen adsorption isotherms of SH-SNT, SO_3H-SNT, $SH_{0.5}$-Ph-SNT and $SO_3H_{0.5}$-Ph-SNT.

Table S1. Physicochemical properties of SH_x-Et-SNT and SH_x-Ph-SNT.

Sample	BET Surface Area ($m^2 \cdot g^{-1}$) [a]	Pore Volume ($cm^3 \cdot g^{-1}$) [b]	Pore Size (nm) [c]
$SH_{0.1}$-Et-SNT	799	2.6	5.5
$SH_{0.2}$-Et-SNT	625	2.2	5.2
$SH_{0.3}$-Et-SNT	490	1.4	4.6
$SH_{0.1}$-Ph-SNT	834	2.1	6.5
$SH_{0.2}$-Ph-SNT	560	1.6	4.4
$SH_{0.3}$-Ph-SNT	530	1.2	5.4
$SH_{0.5}$-Ph-SNT	365	-	-
SH-SNT	540	1.6	6.3

[a] Surface area was determined using the Brunauer-Emmett-Teller (BET) model; [b] Pore volume was obtained at the relative pressure of 0.8; [c] Pore size was estimated Barrett-Joyner-Halenda (BJH) method with adsorption branch.

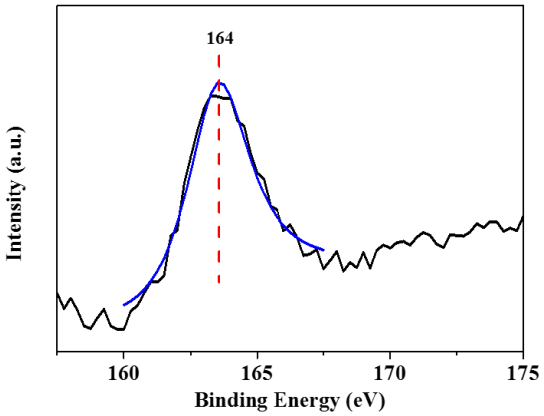

Figure S5. XPS spectrum of $SH_{0.1}$-Et-SNT.

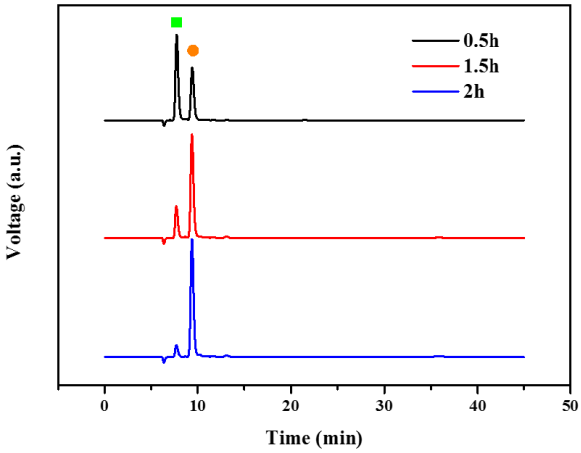

Figure S6. Liquid chromatography spectra of mixture including cellubiose (green square) and glucose (orange circle) after reaction using $SO_3H_{0.3}$-Ph-SNT as catalyst.

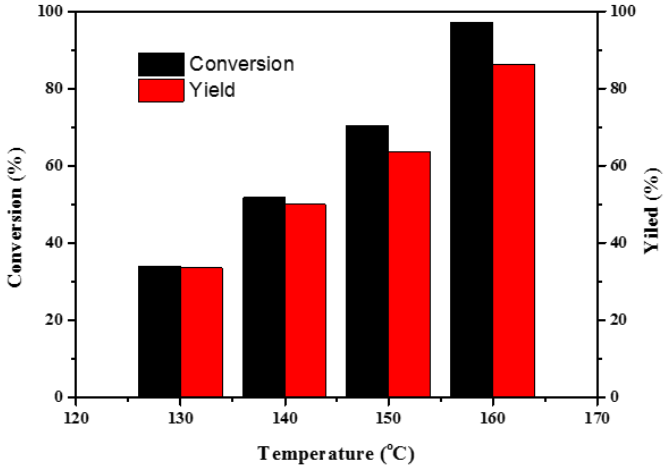

Figure S7. Temperature effect on hydrolysis of cellubiose using $SO_3H_{0.1}$-Ph-SNT as catalyst. Hydrolysis of cellubiose by using $SO_3H_{0.1}$-Ph-SNT as catalysts at 130 °C, 140 °C, 150 °C and 160 °C, respectively. Reaction conditions: 50 mL autoclave, 20 mL deionized water, substrates: acid active sites = 14, 0.2 g cellubiose, 2.5 MPa Nitrogen, 800 rpm, 2 h.