

## Supporting information

### Rigid Bolaform Surfactant Templated Mesoporous Silicon Nanofiber for Lithium Energy Storage

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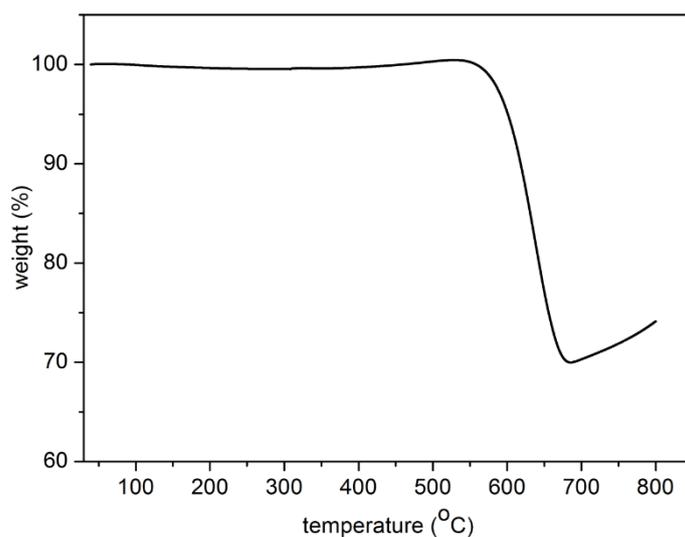


Figure S1. Thermogravimetric curve of the nf-Si@C.

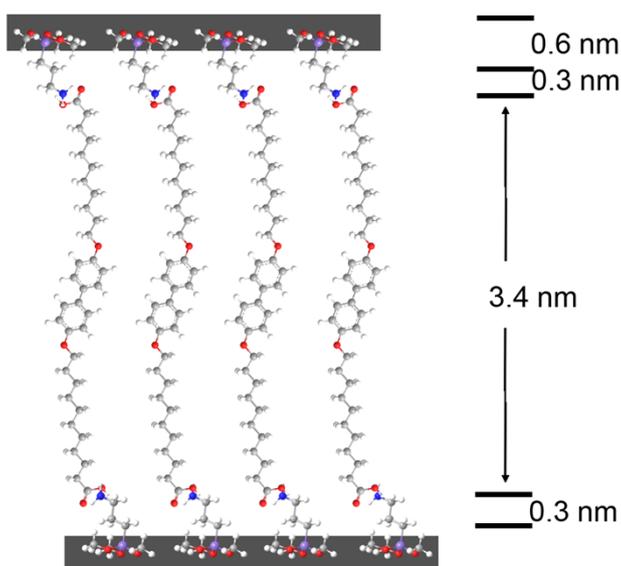


Figure S2. Possible packing configuration of the surfactants in the lamellar silica framework.

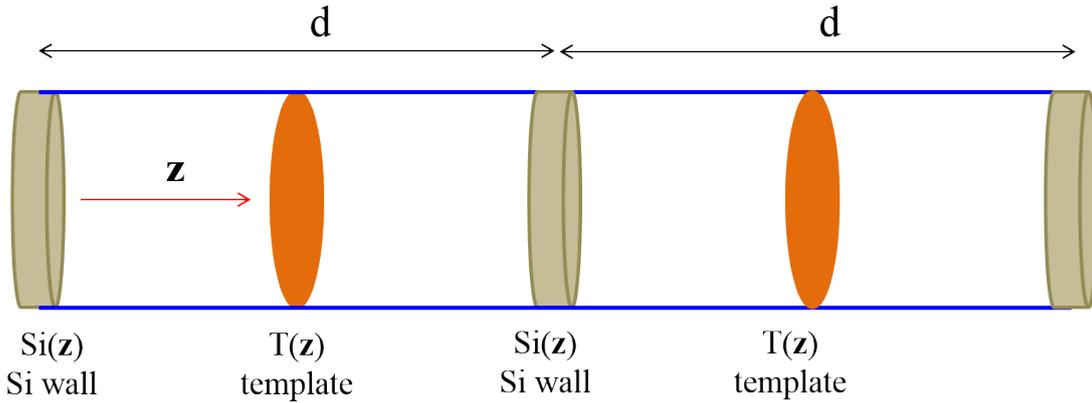


Figure S3. The mechanism to explain the Low-XRD pattern of the as-synthesized silica nanotube.

Assuming that the electron density accumulates at the center of silica wall and center of the template, and the scattering factors are  $S_i(\mathbf{z})$  and  $T(\mathbf{z})$  respectively, then:

For 1D crystal,  $C(\mathbf{r}) = \{B(\mathbf{z}) \cdot H(x, y)\} * \{L(\mathbf{z}) \cdot S(\mathbf{z})\}$

Herein,  $B(\mathbf{z}) = S_i(\mathbf{z}) + T(\mathbf{z})$ ;

The structure factor in the reciprocal space,

$F(C(\mathbf{r})) = F(S_i(\mathbf{z}) + T(\mathbf{z})) \cdot F(L(\mathbf{z})) * F(S(\mathbf{z}))$ , therefore,

$$F(\mathbf{k}) = f_{Si}(\mathbf{k})e^{2\pi i \mathbf{k} \cdot \mathbf{z}} + f_{template}(\mathbf{k})e^{2\pi i \mathbf{k} \cdot (\mathbf{z} + \mathbf{d}/2)}$$

The first reflection:

$$F_{1st} = [f_{Si}(\mathbf{k}) - f_{template}(\mathbf{k})]$$

The second reflection:

$$F_{2nd} = [f_{Si}(\mathbf{k}) + f_{template}(\mathbf{k})]$$

When  $f_{Si}(\mathbf{k}) = f_{template}(\mathbf{k})$ , the intensity of the first peak will be zero. This can be regarded as lattice centering, which is different from the accidental extinction.