

Fabrication of silica hollow microcoils with mesoporous walls

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Hollow silica microcoils have been prepared by using functionalized carbon microcoils (CMCs) as hard templates [1,2] and surfactant aggregates as soft templates. The obtained materials have been characterized by electron and optical microscopy, small angle X-ray scattering, thermogravimetry and porosimetry (gas sorption analysis). The obtained hollow microcoils resemble the original hard templates in shape and size. Moreover, they have mesoporous walls (pore size ≈ 3 nm) with some domains where pores are ordered in a hexagonal array, originated from surfactant micelles. As a result the surface area of the silica microcoils is much higher than that of the original CMCs used as templates. The obtained silica microcoils also show preferential adsorption of cationic fluorescent dyes. A mechanism for the formation of silica microcoils is proposed.

References

- [1] Motojima, S.; Chen, X., Bull. Chem. Soc. Jpn. **80** (2007) 449.
[2] Adhikari, P.D.; Tai, Y.; Ujihara, M.; Chu, C-C. ; Imae, T.; Motojima, S., J. Nanosci. Nanotechnol. **10** (2010) 833.

Figures

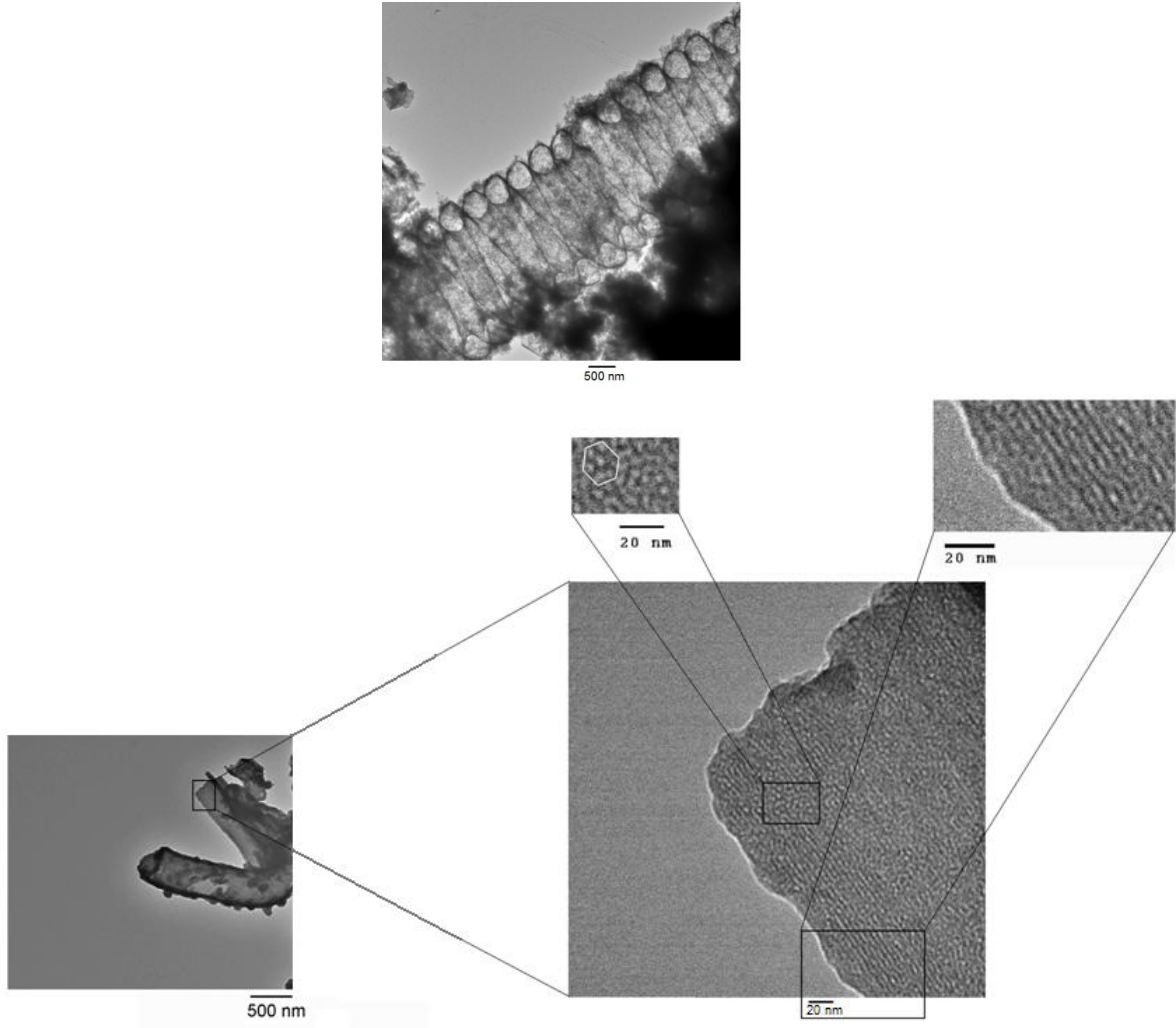


Figure 1: TEM images of sections of silica hollow microcoils.

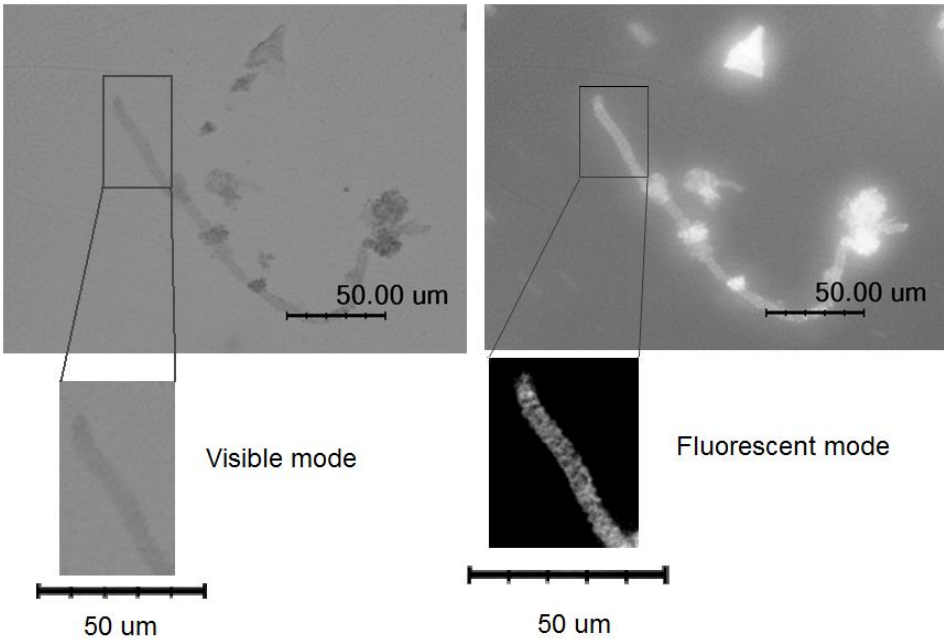


Figure 2: Visible and fluorescent microscopic images of hollow silica microcoils after soaking them in aqueous solutions of rhodamine B