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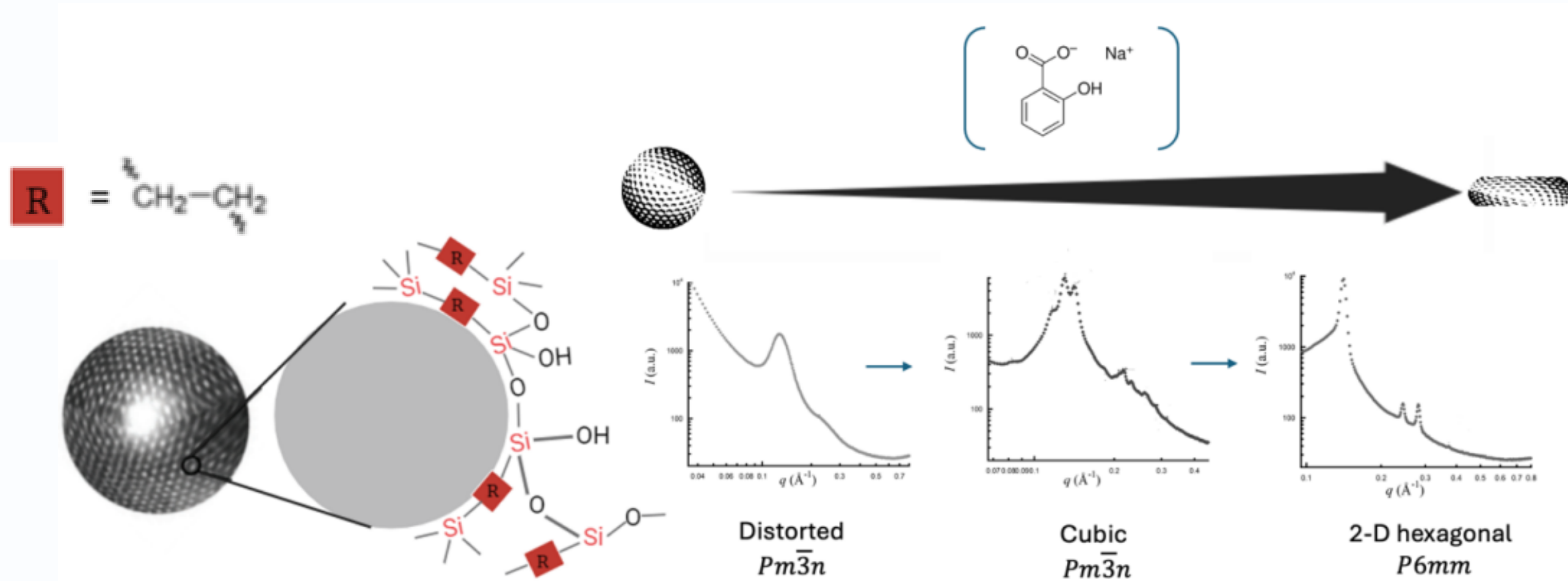
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Introduction

Periodic mesoporous organosilica nanoparticles (PMOs) are one of the most advanced organic-inorganic hybrid silica materials that proved to overcome some limitations of traditional mesoporous silica nanoparticles. The acquired ordered porous network that is very homogeneous in size allows a fine control of the drug load and release kinetics.

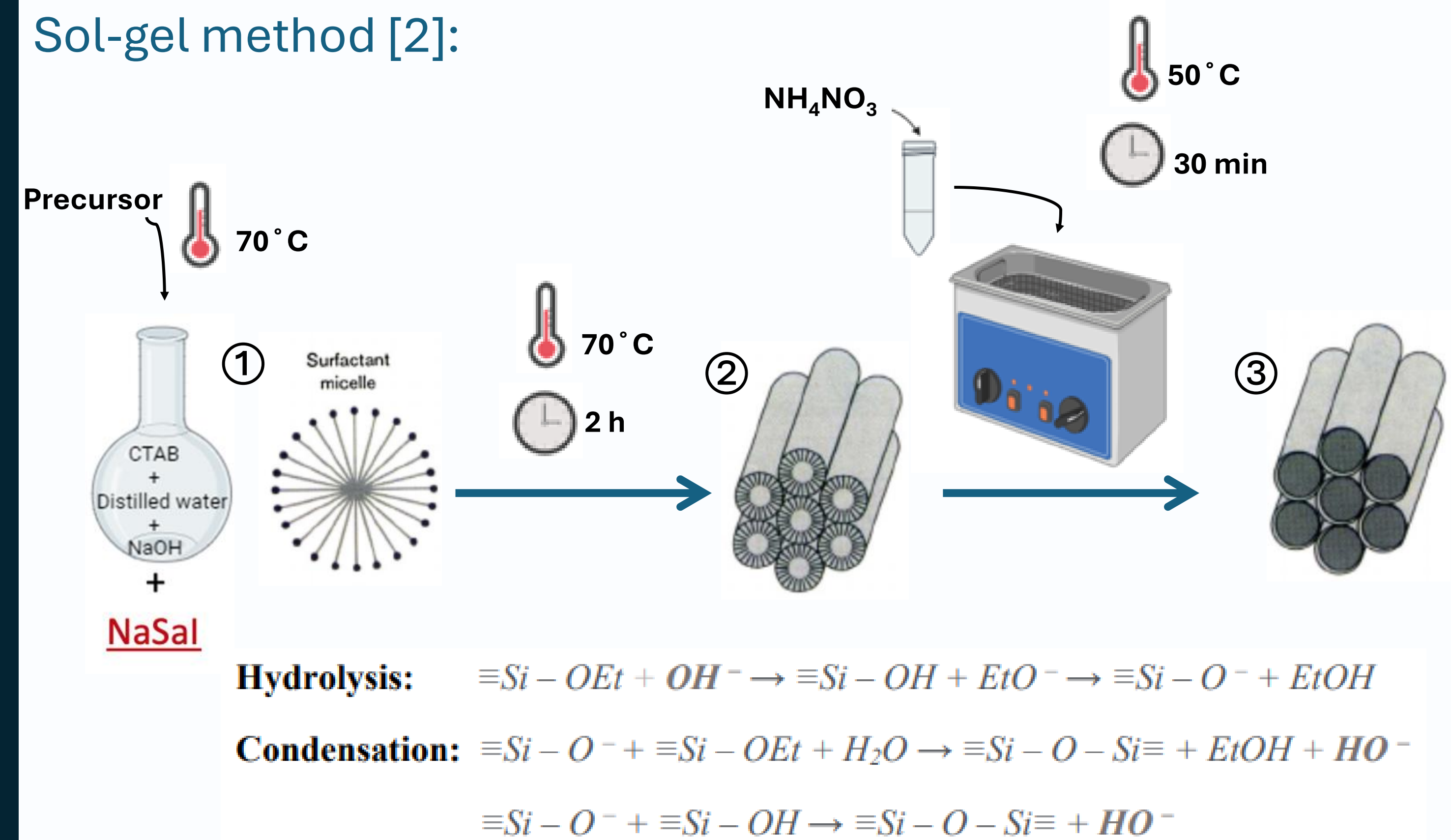
Different additives like organic salts were previously used [1] in order to structurally modulate bulk ethylene PMOs (Et-PMO) which normally acquire a distorted cubic structure, into well-organized structures.

In this work, we present the first successful synthesis and characterization of Et-nanoPMOs with different pore structures and external morphologies upon varying the amount of sodium salicylate added. We also initiated a mechanistic study to understand the variations in texture and morphology.

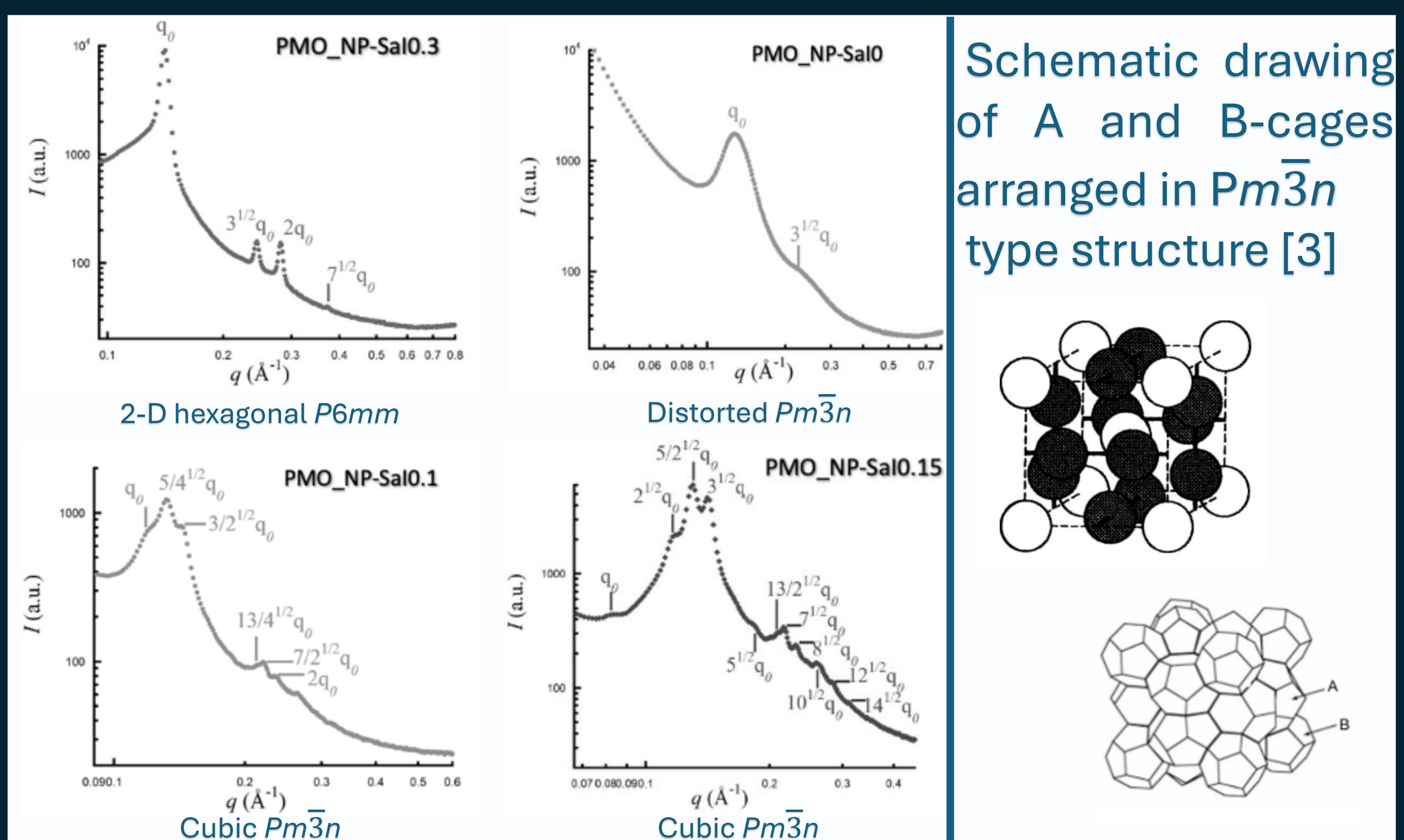


Synthesis

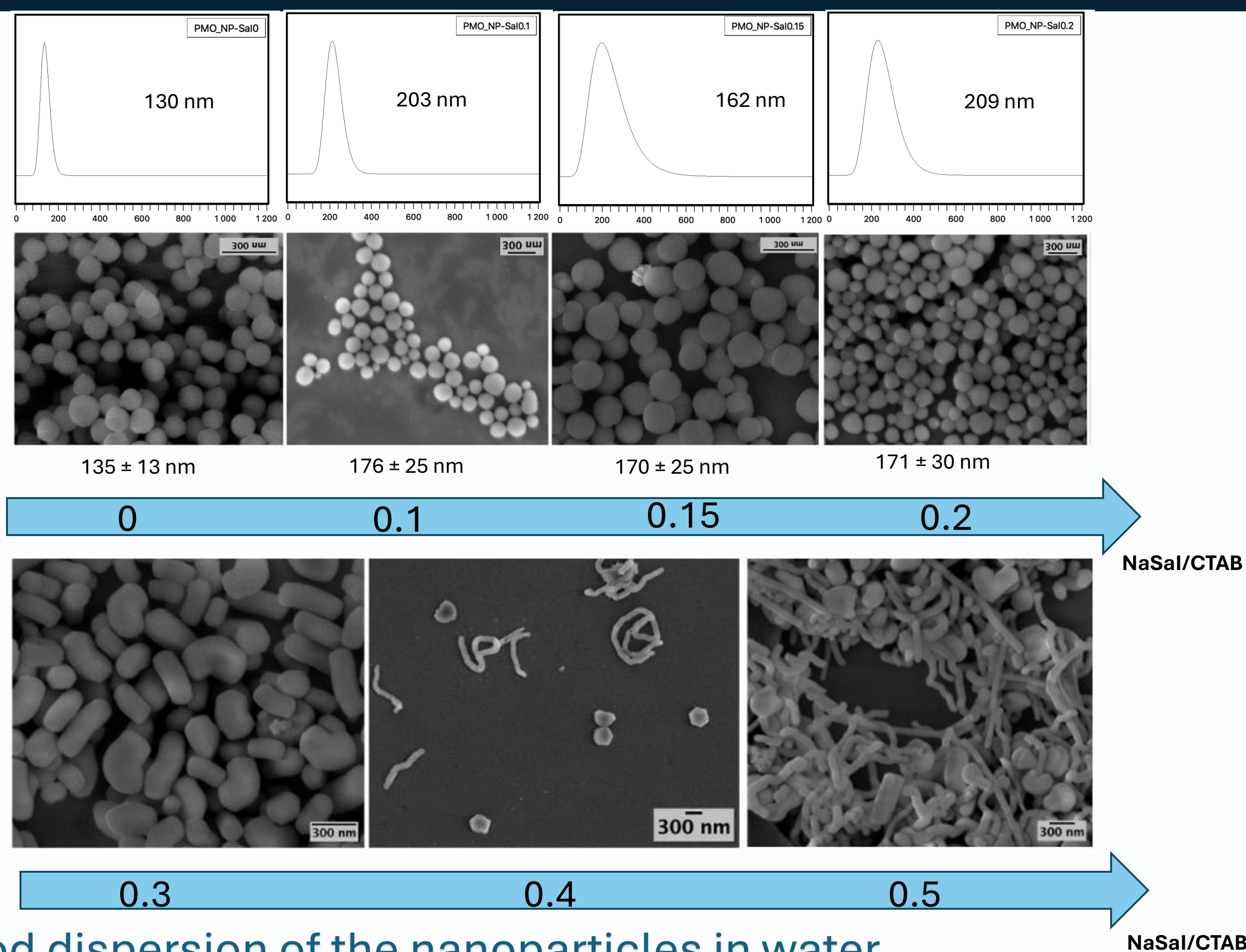
Sol-gel method [2]:



Small-angle X-ray scattering / Transmission Electron Microscopy



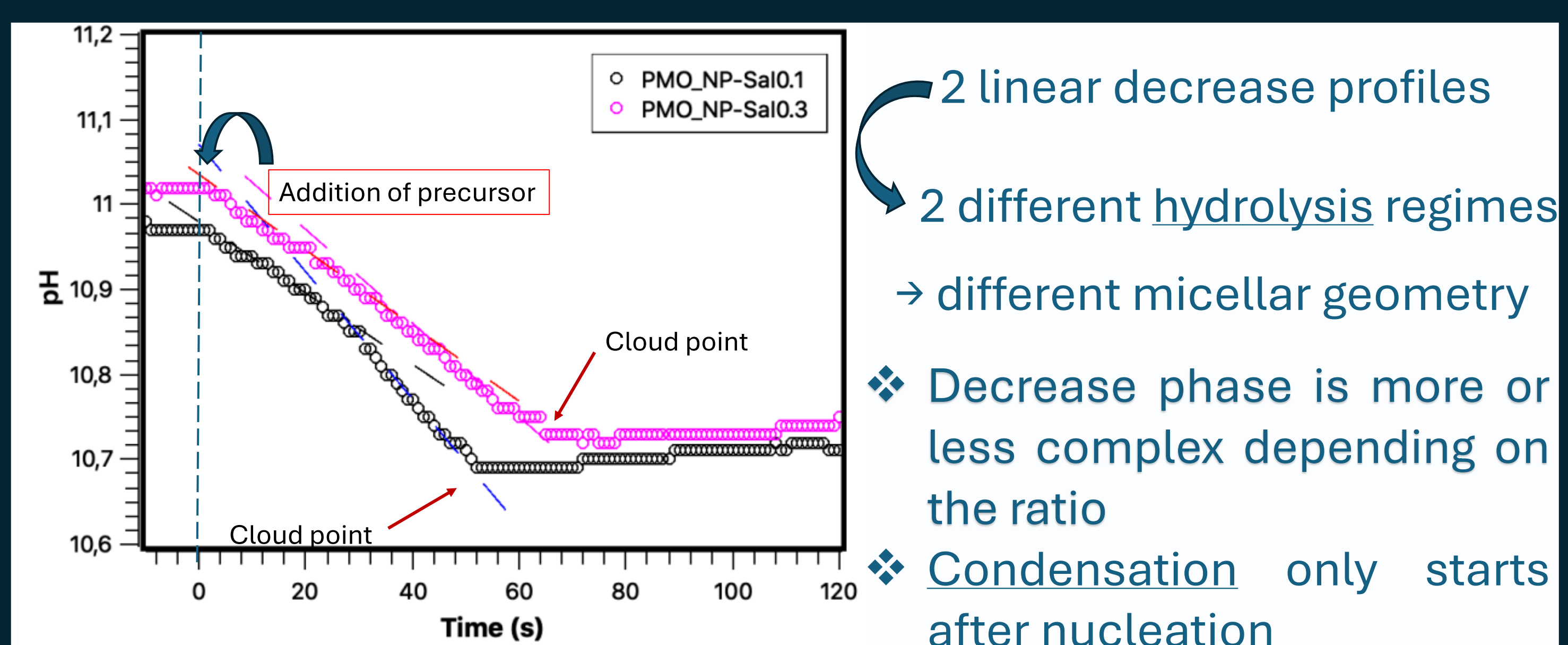
Dynamic Light Scattering / Scanning Electron Microscopy



- ✓ Good dispersion of the nanoparticles in water
- ✓ Nearly spherical objects for low ratio
- ✓ Upon increasing the amount of sodium salicylate, the aspect ratio increases

✓ Porous structure
Visual characterization of previous results

Mechanistic study by pH



Summary and Outlook

The addition of various amounts of sodium salicylate resulted in:

- ✓ Structural modulation of Et-PMOs between cubic $Pm\bar{3}n$ and hexagonal $P6mm$
- ✓ Change in morphology from nanospheres to nanorods and nanofibers
- ✓ Different mechanistic profiles
- Further characterization of porosity by gas sorption
- Effect of the pore arrangement on the encapsulation of drugs

Acknowledgements

This study was funded by the UGA Soft-Nano Graduate School (ANR-20-SFRI-0007). All these experiments were conducted at Institut Néel (OPTIMA group)

References

- [1] Cattoën, X. et al Periodic mesoporous organosilica nanoparticles: Morphology control and sorption properties. Colloids Surf. Physicochem. Eng. Asp. 677, 132325 (2023).
 [2] Lin, F. et al. Structure modulation of periodic mesoporous organosilicas with organic salts. J. Mater. Sci. 56, 13590–13603 (2021).
 [3] Sakamoto, Y. et al. Direct imaging of the pores and cages of three-dimensional mesoporous materials. Nature 408, 449–453 (2000)