



Institut Européen des Membranes



Mona Semsarilar

***RNJP 2015
La Grande-Motte***





Institut Européen des Membranes

www.iemm.univ-montp2.fr

Director: Prof. Philippe MIELE

Philippe.miele@iemm.univ-montp2.fr



- 43 researchers
- 26 engineers, technicians et administrative staff
- > 90 post-docs, PhD students ...



«From advanced materials to new processes»

- ❑ *Membranes and membranes processes*
- ❑ *Polymeric, ceramic and hybrid polymer composites membranes*
- ❑ *Supramolecular chemistry*
- ❑ *Network structure-transport properties*
- ❑ *Simulation and pilot-scale level studies*



Founding Institutions of IEM



Founded in 1809

- 16,000 students
- 7,600 employees
- 1,500 researchers
- 2,500 publications/year
- 210 million€ budget



Founded in 1889

- 400 students
- 130 researchers



Founded in 1939

- 34,530 employees
- 11,450 researchers
- 3.3 billion€ budget



Impact

Public service



UNESCO Chair on membrane science for environment
Prof. Louis Cot



- Erasmus Mundus Master in Membrane Engineering EM3E (<http://em3e.eu>)
- Erasmus Mundus Doctorate in Membrane Engineering EUDIME (<http://eudime.unical.it>)

Industry



Dedicated to enhance the industrial implementation of membrane-based technologies

Prof. Gilbert M. Rios

<http://www.euromemhouse.com>



"Chemistry, Environment and Sustainability"

<http://www.instituts-carnot.eu/en/node/243>

4 MAIN APPLICATIONS

Water



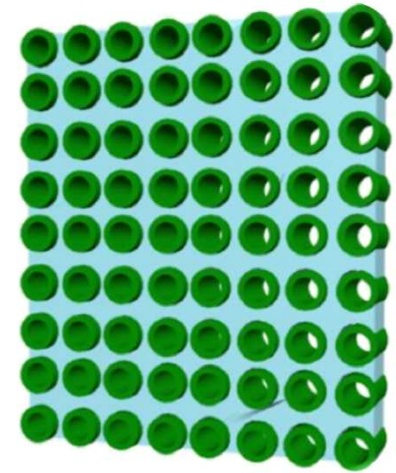
Health



Energy



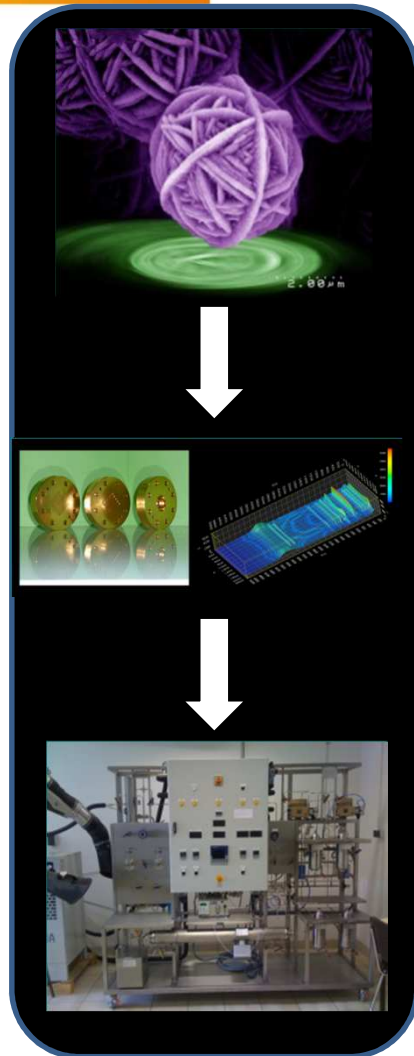
Membranes
of the future



More than 100 peer reviewed papers / year



3 RESEARCH DEPARTMENTS



**Design of
Membrane
Materials and
Multifunctional
Systems**

Adaptative
Supramolecular
Nanosystems

Nanocomposite
& Nano-hybrid
membrane
materials

DM³

**Interfaces, Physical-
chemistry,
Polymers**

Ionics

Polymer & Bio-
inspired
Interfaces

IP²

**Membrane Process
Engineering**

Process
Intensification

Material
Process
Engineering

GPM

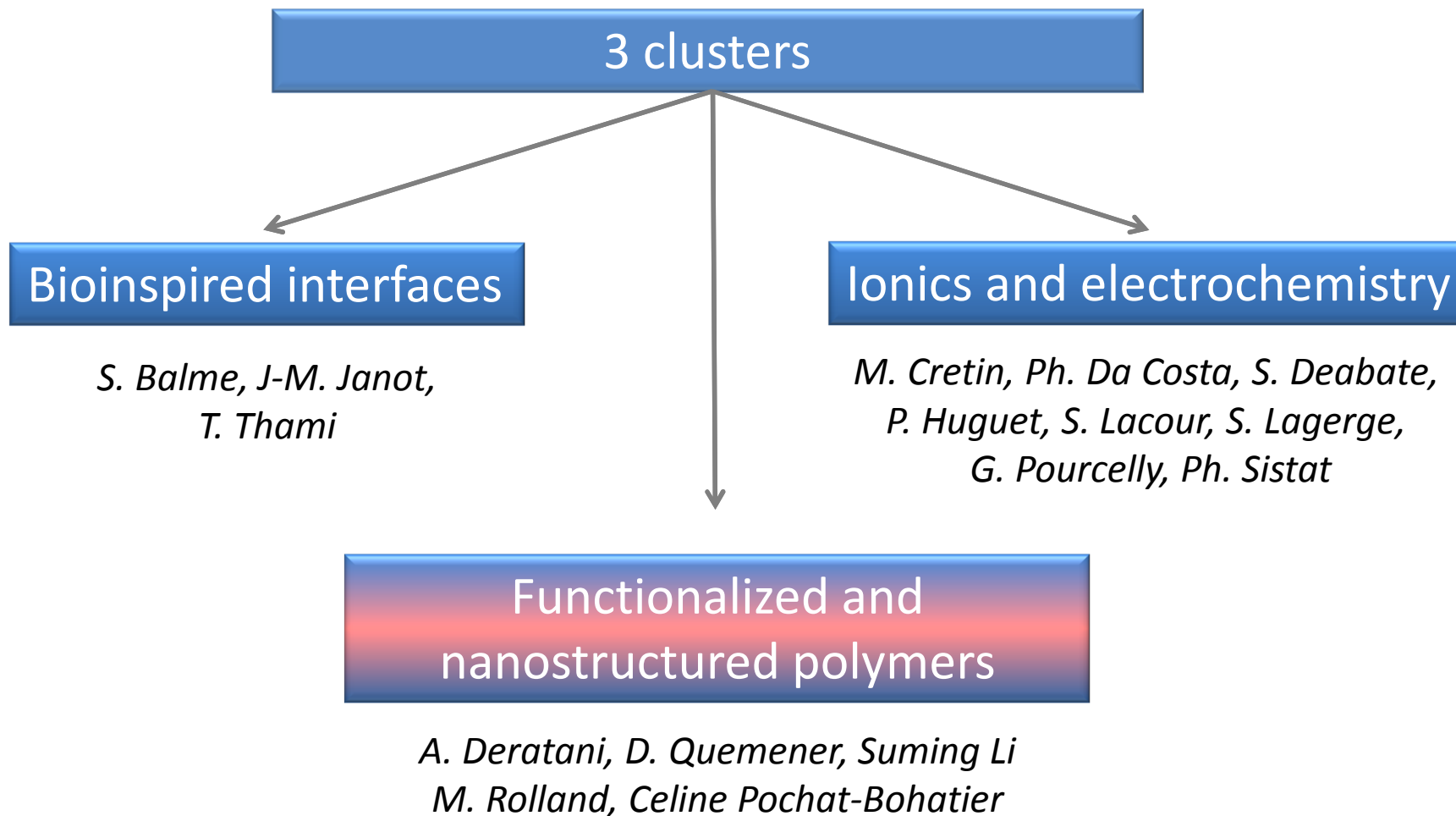
IP²: Interfaces, Physical-chemistry, Polymers



- 15 researchers



IP²: Interfaces, Physical-chemistry, Polymers



« Polymer » Team

André Deratani

DR1

CNRS

Damien Quémener

MCF

Université Montpellier

Marc Rolland

MCF

Université Montpellier

Suming Li

DR1

CNRS

Céline Pochat-Bohatier

MCF

Université Montpellier

Mona Semsarilar

CR1

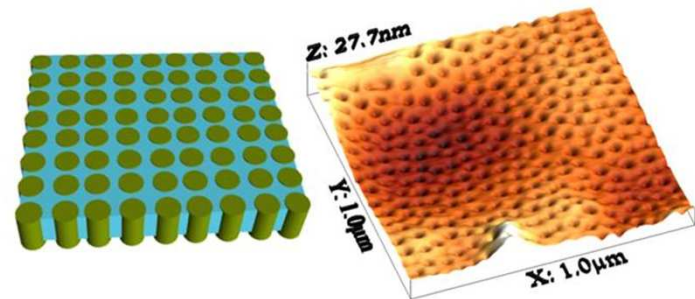
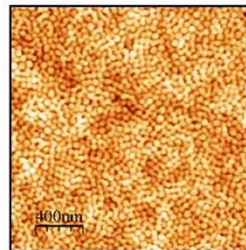
CNRS



« Polymer » Team

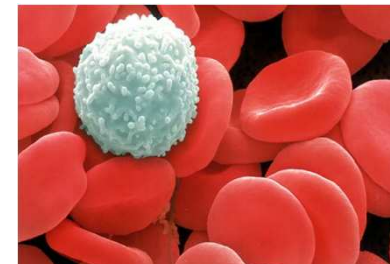
Dynamic and Autonomous Membranes

- Block copolymer synthesis by controlled polymerization
- Self-assembly in bulk and solution
- Autonomous pore size tuning
- Self-healing membranes

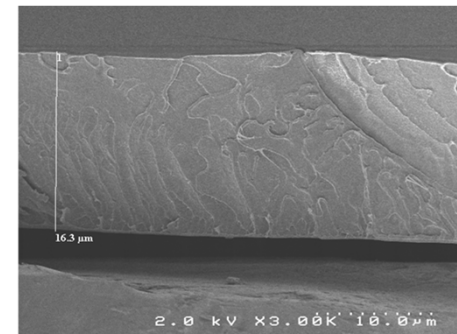
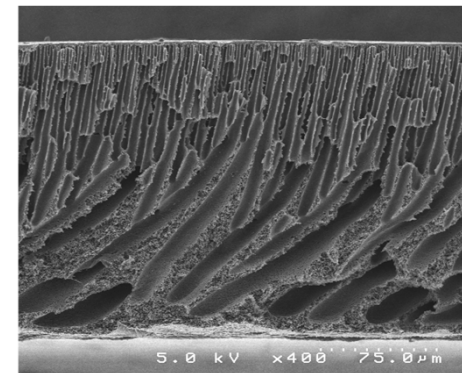
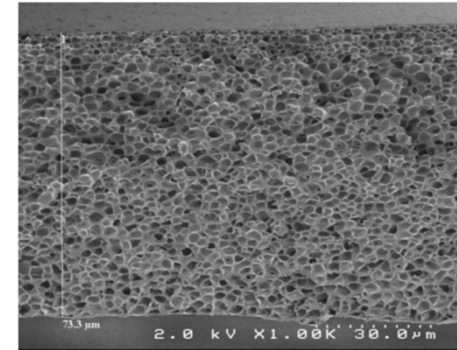
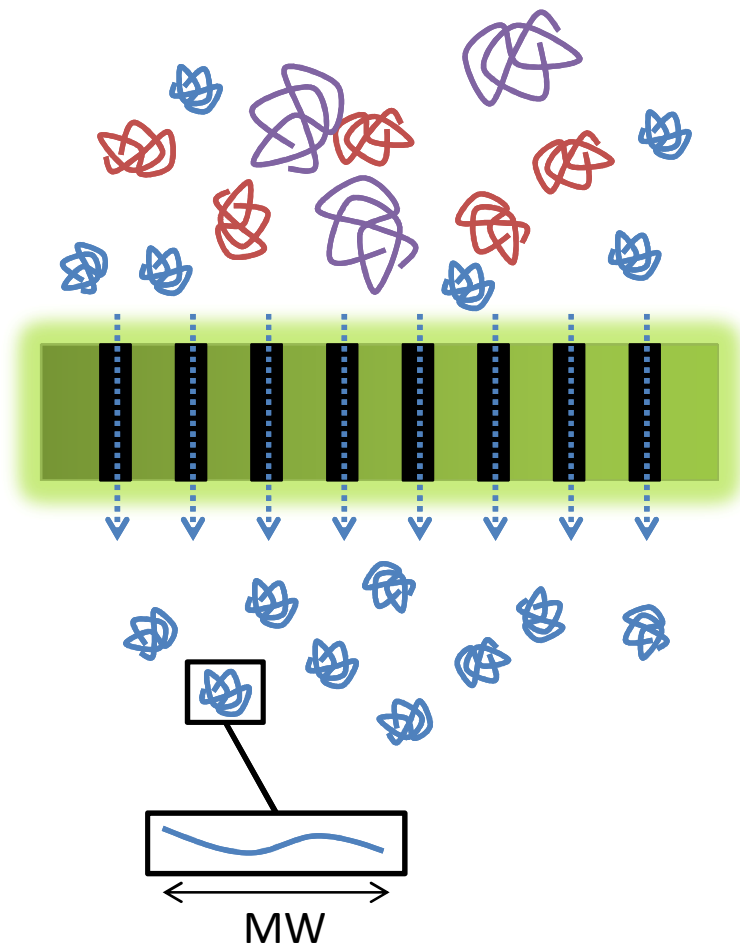


Applications

- Water purification and desalination
- Industrial wastewater treatment
- Blood storage

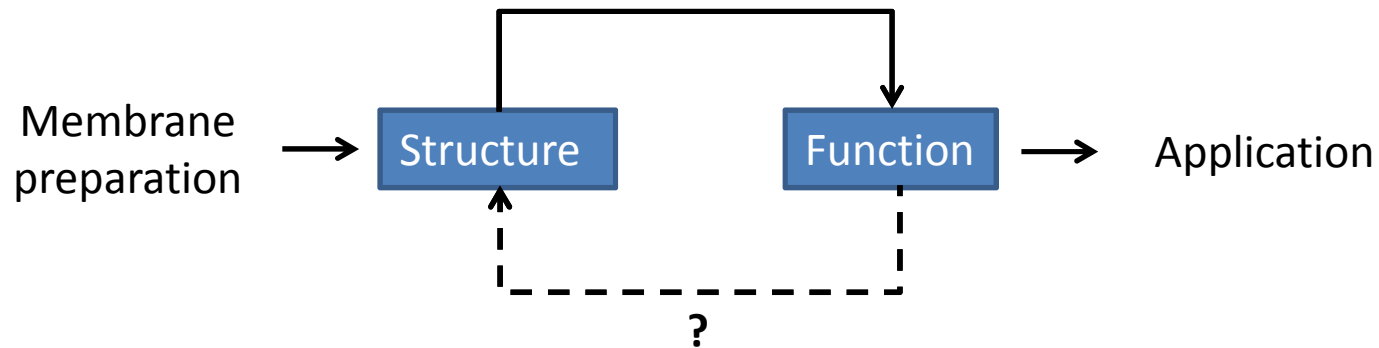


Membrane

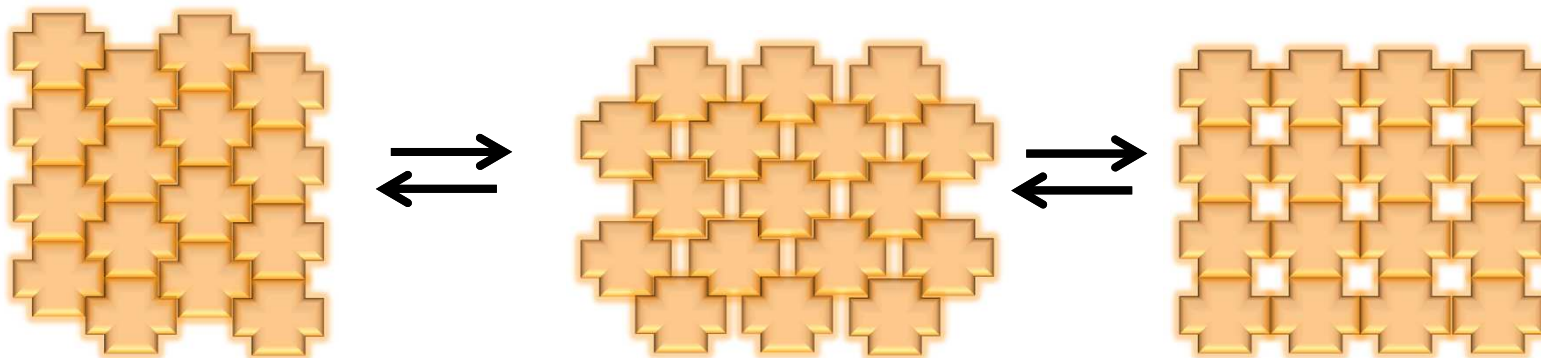




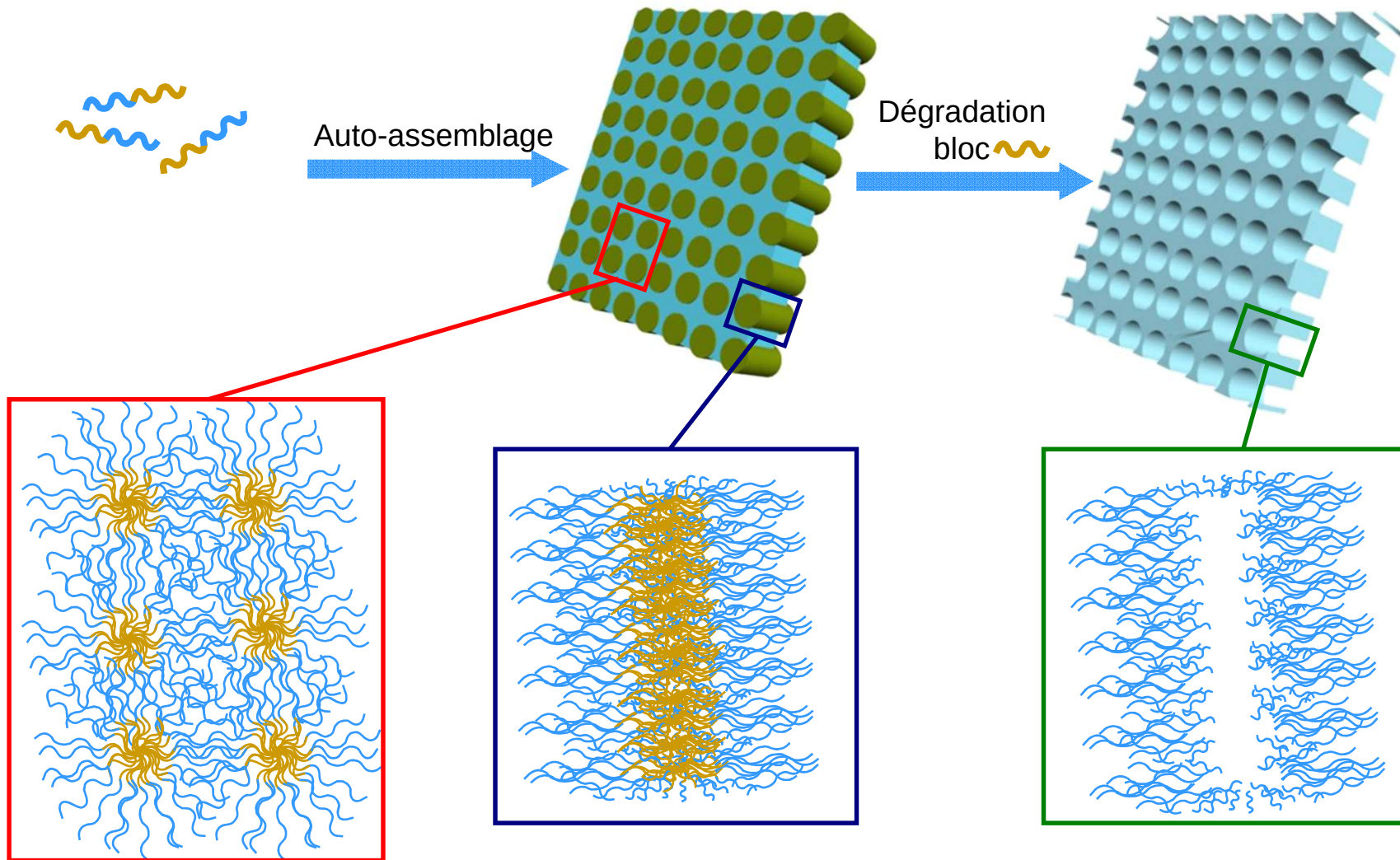
Concept of Dynamic Membranes



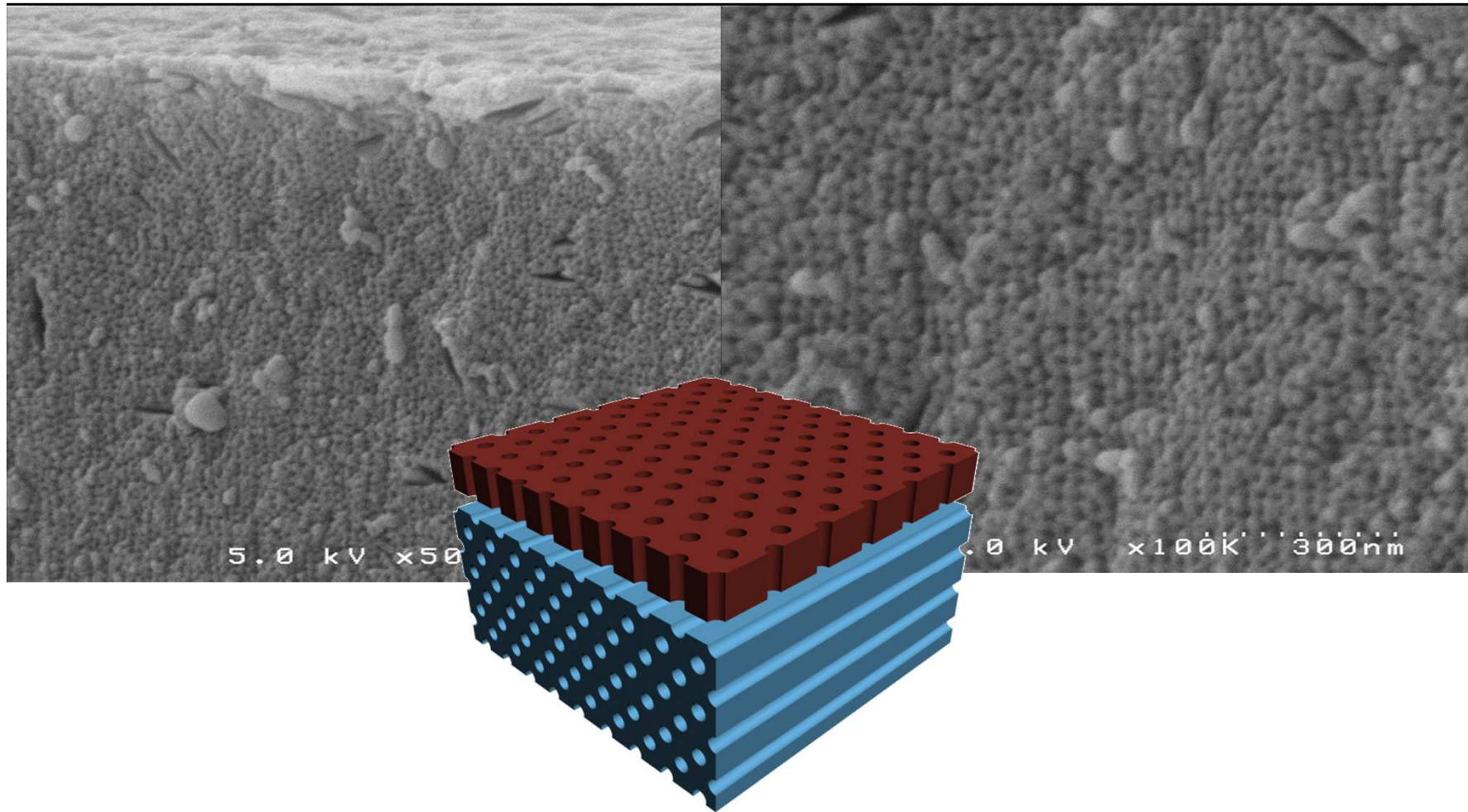
Autonomous structural adaptation



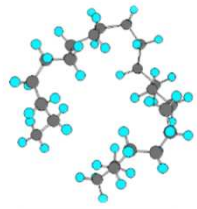
Self-assembly in Bulk



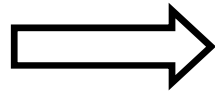
Bulk Self-assembly of PS-*b*-PEO-*b*-PS



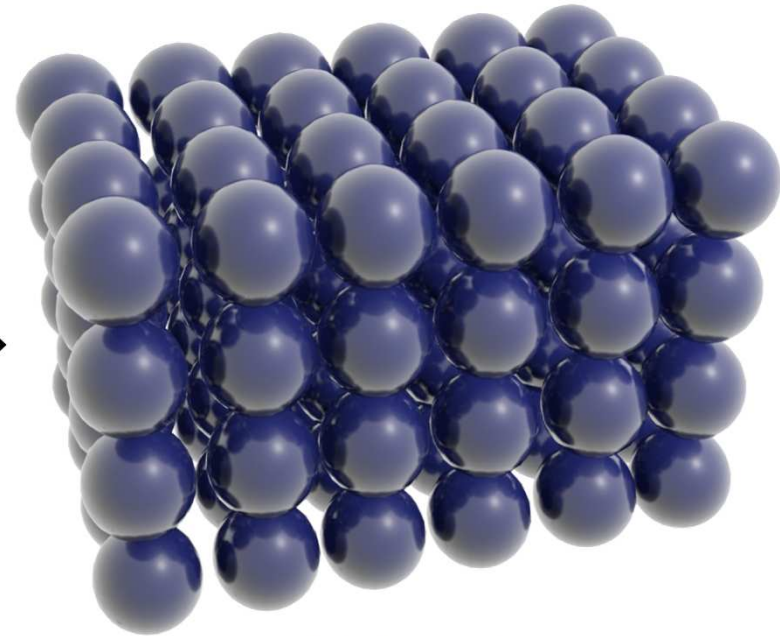
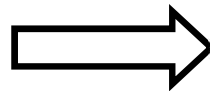
Dynamic Interactive Membranes



Polymer



Building block

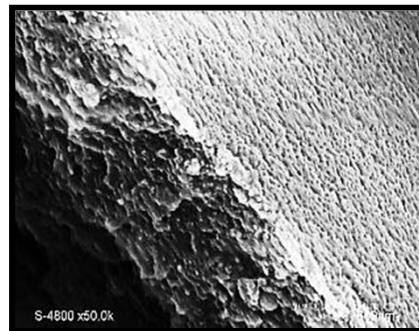
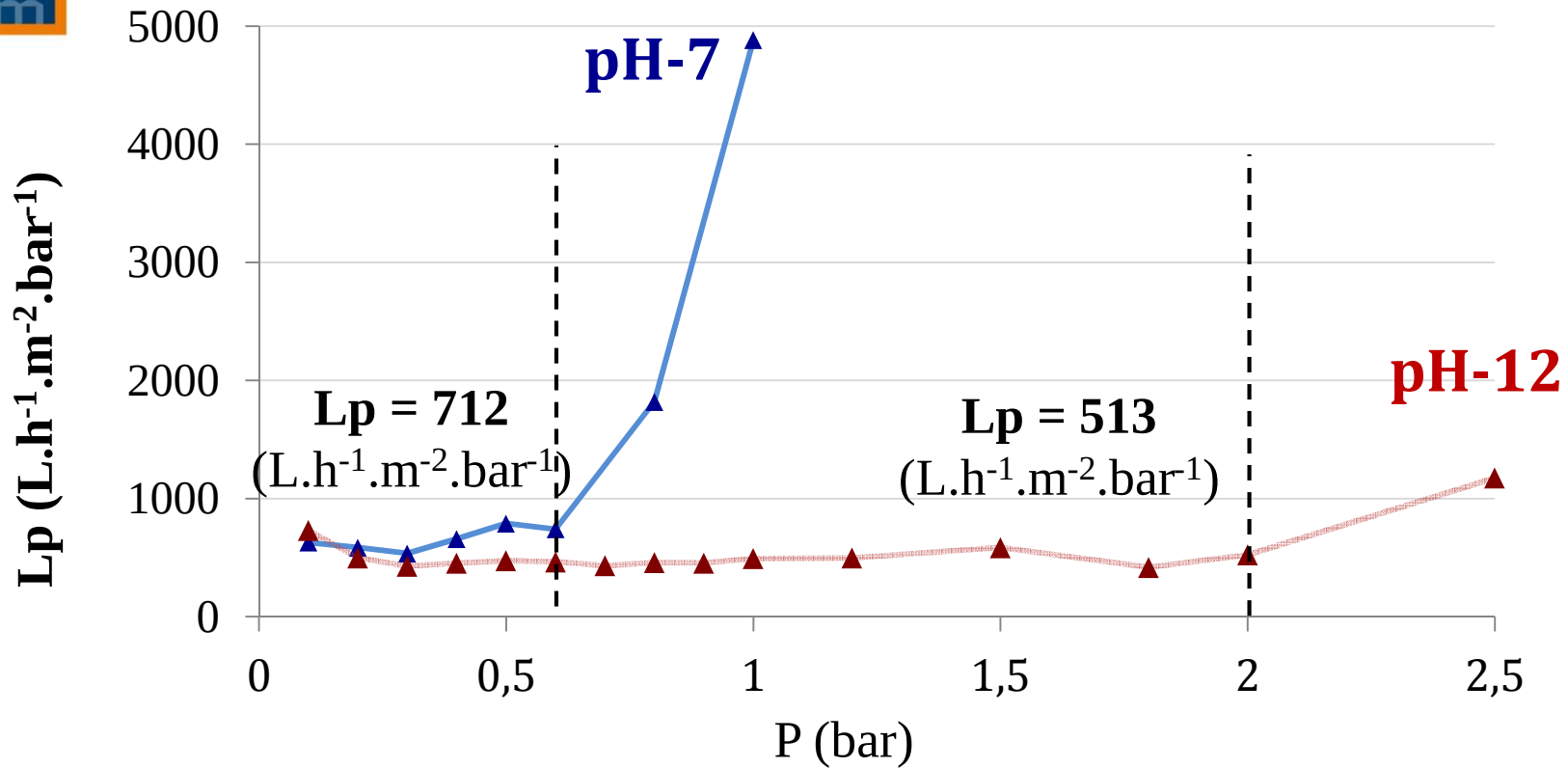


Assembled membrane

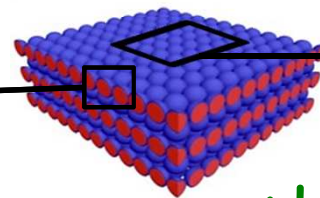


Assembly of nano-building blocks

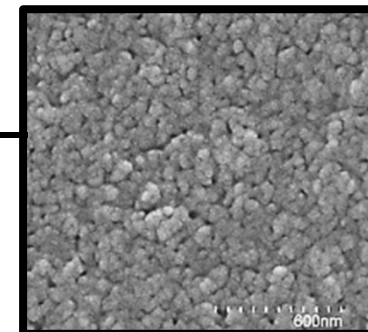
Pressure/ pH Dual Responsive Membrane



PRESSURE



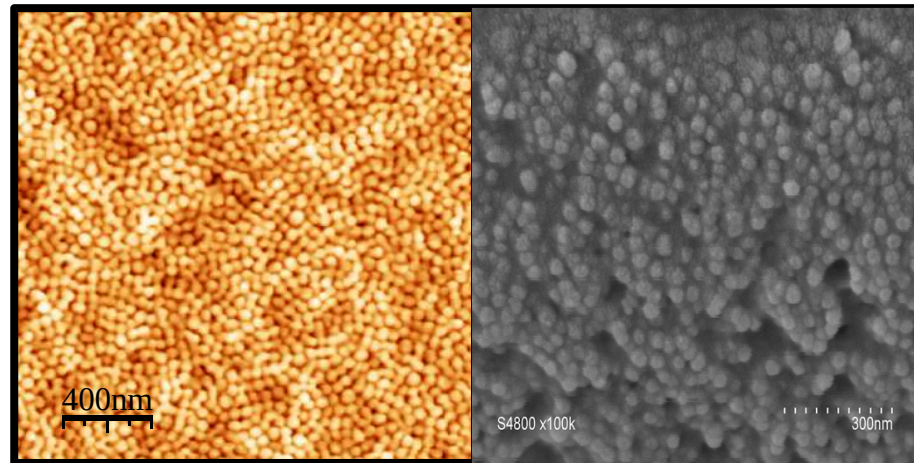
pH



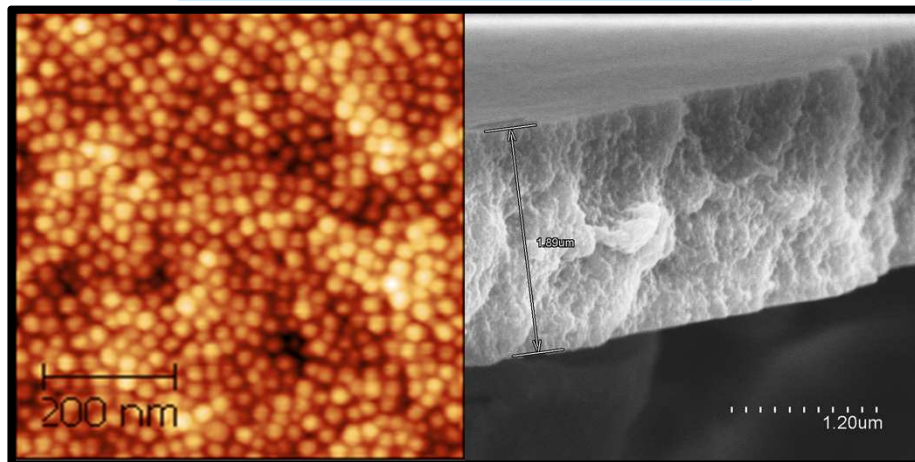
P109

Self-assembled Block Copolymer Membranes

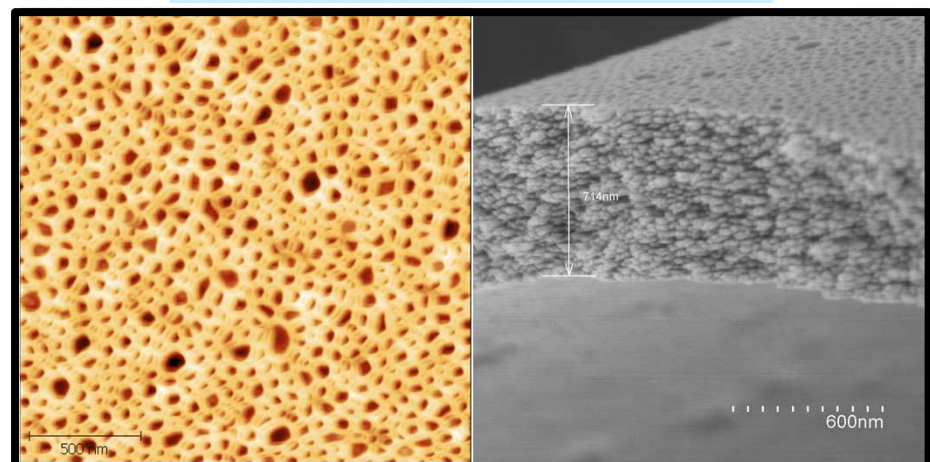
PSAN-PEO-PSAN ; THF/Toluene



PS_{5K}-PSS_{5K}-PS_{5K} ; DMF/H₂O



PS_{10K}-PSS_{10K}-PS_{10K} ; THF/H₂O





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**Thank you
for your attention**

