

# SL 14

## STIMULI-RESPONSIVE POLYPEPTIDE-BASED BIOMIMETIC NANOCARRIERS

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The self-assembly of well-defined polypeptide-based diblock copolymers into micelles and vesicles is presented. The stimuli-responsive behavior of polypeptides to pH and ionic strength is used to produce stimuli-responsive nanoparticles with a control size and shape.<sup>1</sup> Results focusing on polymersomes<sup>1,2</sup> will be detailed by means of static and dynamic light scattering analysis, UV circular dichroism, NMR and small angle neutron scattering experiments. Systems that are able to form vesicles with a narrow size distribution at basic and acid pH going through an intermediate state of single molecule will also be detailed.<sup>2</sup> In addition, the encapsulation of iron oxide nanoparticles into these vesicles, forming hybrid supramolecular hollow objects with a magnetic membrane, which deformation under an applied magnetic field will be evidenced.<sup>3</sup> These multi-responsive nanoparticles, with a structure and physical characteristics similar to viral capsids, are particularly interesting for encapsulation and delivery purpose at a controlled pH or under a specific magnetization.<sup>4,5</sup> Finally, recent results on the preparation of such polymersomes, fully biocompatible and biodegradable poly(trimethylene carbonate)-*b*-poly(glutamic acid)<sup>6</sup> and multi-responsive (pH, temperature)<sup>7</sup> polymersomes poly(dimethylaminoethylmethacrylate)-*b*-poly(glutamic acid)<sup>8</sup> will be described.

<sup>1</sup> F. Chécot, S. Lecommandoux, Y. Gnanou, H.-A. Klok *Angew. Chem. Int. Ed.* **2002**, *41*, 1339.

<sup>2</sup> F. Chécot, S. Lecommandoux, H.-A. Klok, Y. Gnanou *Eur. Phys. J. E* **2003**, *10*, 25.

<sup>3</sup> J. Babin, J. Rodriguez-Hernandez, S. Lecommandoux, H.-A. Klok, M.-F. Achard *Faraday Discussion* **2005**, *128*, 179.

<sup>4</sup> F. Chécot, A. Brûlet, J. Oberdisse, Y. Gnanou, O. Mondain-Monval, S. Lecommandoux, *Langmuir* **2005**, *21*, 4308.