Chemical Control Systems for Soft Materials

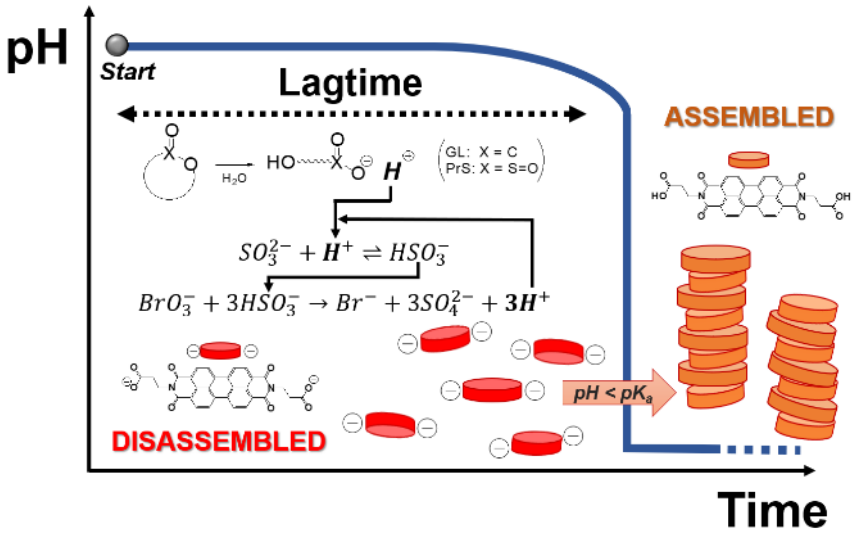
Guido Panzarasa

Laboratory of Soft and Living Materials, Department of Materials, ETH Zürich, Vladimir-Prelog-Weg 1-5/10, Zürich, Switzerland
guido.panzarasa@mat.ethz.ch

Living systems can grow bottom-up materials with the highest degree of sophistication and an overall efficiency which remains largely unparalleled by artificial fabrication techniques. Such astonishing ability comes from the control and exploitation of complex reactions networks organized with a precise spatio-temporal sequence.

The investigation of new ways to control self-assembly in the time domain, taking advantage of the possibilities offered by systems chemistry [1], will make possible to design and develop self-regulating materials.

By means of relatively simple chemical reactions exhibiting nonlinear kinetics (so-called "clock reactions") it is possible to program the formation of biopolymer particles [2] and of supramolecular aggregates [3], including transient self-assembly [4,5]. Time-control can be achieved not only over the assembly of supramolecular building blocks but also on dynamic covalent bond formation, allowing the synthesis of soft materials with a tailorable lifetime.



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