Upper Critical Solution Temperature (UCST)-type Thermoresponsive Polymers from Hydrogen-Bonding Monomers

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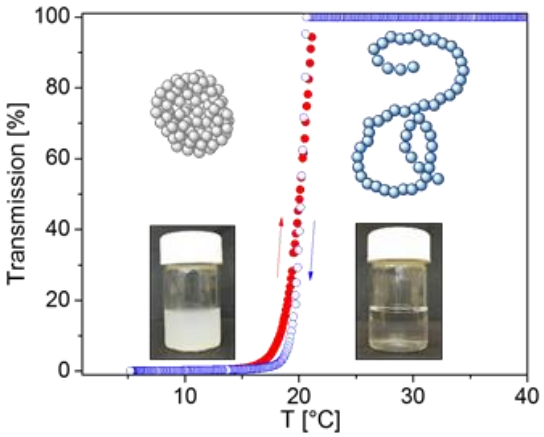
UCST-type thermoresponsive polymers (i.e. that phase separate from solution upon cooling) present a tremendous potential not only in aqueous media where they can be used in drug delivery, diagnostic and microfluidic applications,[1] but also in water/alcohol mixtures, where they can be used for instance in sensing systems for alcohol-soluble drugs.[2] However, only a few thermoresponsive polymers have been reported that present an UCST in a relevant temperature range and “green” solvents such as water or ethanol.[1,2]

In this context, acrylamide-based monomers can be very useful building blocks for designing novel non-ionic UCST-type polymers because of their hydrophilic nature (with the appropriate side chain) and propensity to form hydrogen bonds. We will present our latest results on the UCST-type thermoresponsive behaviour of acrylamide- and 2,6-diaminopyridine-based homopolymers and copolymers in water or water/alcohol mixtures,[3-5] and give some insights about the rational design of UCST polymers relying on H-bonding.



References

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