FUNCTIONAL POLYMERIC SENSORS

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In the last decades, responsive polymeric materials are gaining significant interest for the development of smart materials.¹ Within this context, thermoresponsive polymers that undergo a solution phase transition in aqueous solution are especially interesting. Polymers that phase-separate upon heating, so-called lower critical solution temperature (LCST) behaviour, are widespread based on entropy-driven dehydration of polymers with intermediate hydrophilicity, such as poly(N-isopropylacrylamide),² poly(oligoethyleneglycol (meth)acrylate)s³ and poly(2-oxazoline)s.^{3,4}

Recent progress from our group in the area of responsive polymer sensors will be addressed in this contribution. A first topic that will be discussed are multi-responsive solution polymer sensors, that simultaneously respond to temperature and pH⁵ or temperature and salt.⁶ These latter systems are based on polymer coated gold nanoparticles and also act as logic gates.⁷ Secondly, solid state sensors for gases will be discussed based on electrospun fibrous mats functionalized with halochromic dyes.⁸ These systems show a near instantaneous change of color when exposed to acid or base vapors as well as to biogenic amines.

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