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Surface Characterization of pNIPAM Under Varying Absolute Humidity ARNAV CHHABRA, RAVITEJ KANAPURAM, HARRISON LEVA, JUAN TREJO, TAE JIN KIM, CARLOS HIDROVO, University of Texas at Austin — Poly(N-isopropylacrylamide) has become ubiquitously known as a "smart" polymer, showing many promising applications in tissue engineering and drug delivery systems. These applications are particularly reliant on its trenchant, thermally induced hydrophilic-hydrophobic transition that occurs at the lower critical solution temperature (LCST). This feature imparts the pNIPAM programmable adsorption and release capabilities, thus eliminating the need for additional enzymes when removing cells from pNIPAM coated surfaces and leaving the extracellular matrix proteins of the cells largely untouched. The dependence of the LCST on molecular weight, solvent systems, and various salts has been studied extensively. However, what has not been explored is the effect of humidity on the characteristic properties of the polymer, specifically the LCST and the magnitude of the hydrophilic-hydrophobic transition. We studied the surface energy variation of pNIPAM as a function of humidity by altering the absolute humidity and keeping the ambient temperature constant. Our experiments were conducted inside a cuboidal environmental chamber with control over the temperature and humidity inside the chamber. A controlled needle was employed to dispense size-regulated droplets. Throughout this process, a CCD camera was used to image the droplet and the static contact angle was determined using image processing techniques. The behavior of pNIPAM as a function of humidity is presented and discussed.

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