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Coil-Globule Transition of PNIPAM in Non-Ionic Surfactant Mesophase V.J. JIJO, NCL, Pune, India, K.P. SHARMA, R. MATHEW, P.R. RAJAMOCHANAN, K. GURUSWAMY, NCL,Pune,India — We investigate the Coil-Globule transition of linear poly N-isopropylacrylamide (PNIPAM) in the hexagonal (H_1) mesophase of a non ionic surfactant, $C_{12}E_9$ in water, by Turbidimetry, NMR and SAXS. For aqueous PNIPAM, the LCST (coil-globule transition temperature), T_{PNIPAM} , is 35°C , whereas the H_1 phase transitions to a micellar phase at a temperature, T_{HI} , of 45°C . As PNIPAM is added to the $C_{12}E_9/H_2O$ system; depending on the ratio of $C_{12}E_9:H_2O$, T_{PNIPAM} changes. It is observed that at 42wt% of $C_{12}E_9$ (viz. 58wt% water; micellar phase), the T_{PNIPAM} is 33°C . At 44wt% of $C_{12}E_9$ (viz. 56wt% water), the H_1 phase forms and the the coil-globule transition for PNIPAM starts at 28°C . For 50wt% $C_{12}E_9$, the transition starts from 13°C and for 60wt% $C_{12}E_9$ in water, PNIPAM does not even shows the phase transition even as below as 5°C . It is observed using optical microscopy that the PNIPAM is trapped at the domain boundaries of the H_1 phase. The decrease in the coil globule transition temperature, T_{PNIPAM} , is not only because of the hydrophobic interactions but also due to the competition between polymer and $C_{12}E_9$ for water in the H_1 phase. The inability of PNIPAM to become a complete globule at higher temperature may be due to the adsorption of $C_{12}E_9$.

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