Supplementary material

Water density visualization: The water density figures were plotted using the density option of volmap plugin of vmd, in which the water number density (red to blue: low to high) was computed by additively distributing normalized Gaussians of width equal to atomic radius of mW particle (i.e. oxygen atom) on a 2 Å grid. Then, the generated volumetric maps were visualized using the volumeslice display method, in which a two-dimensional slice of the volumetric data in the plane of the polymer was shown.

Table S1: Density of mW water at (T, P) studied

T(K)	P(atm)	Density(kg/m^3)
250	1	1002
400	1	960
400	2500	1000
400	10000	1080
800	1	710

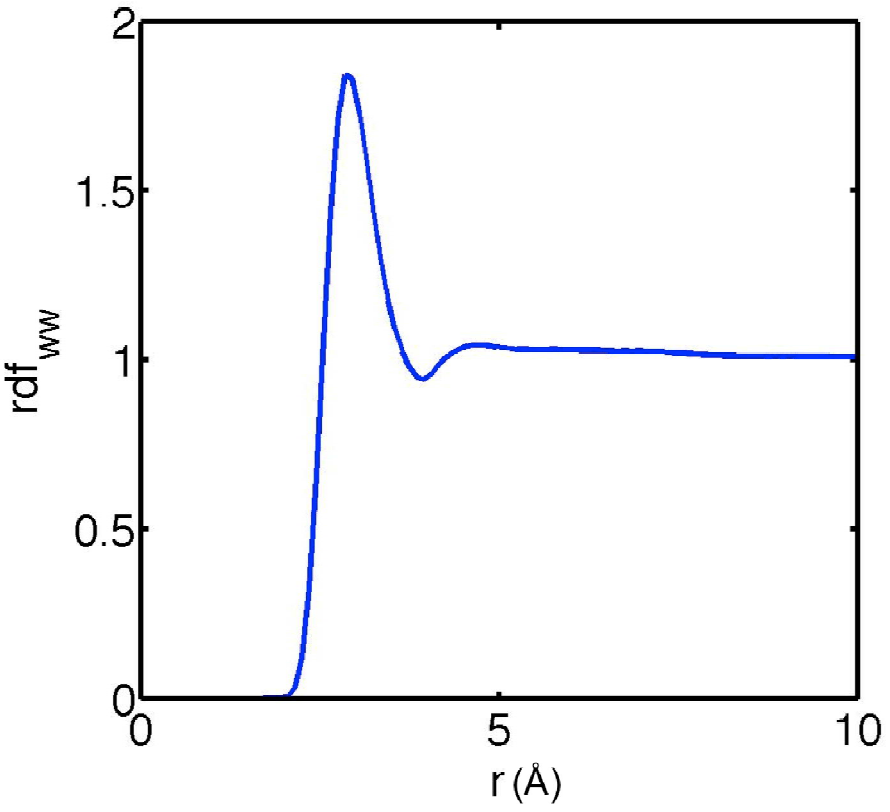

Figure S1: Water-water radial distribution function for T=800K and P=1atm

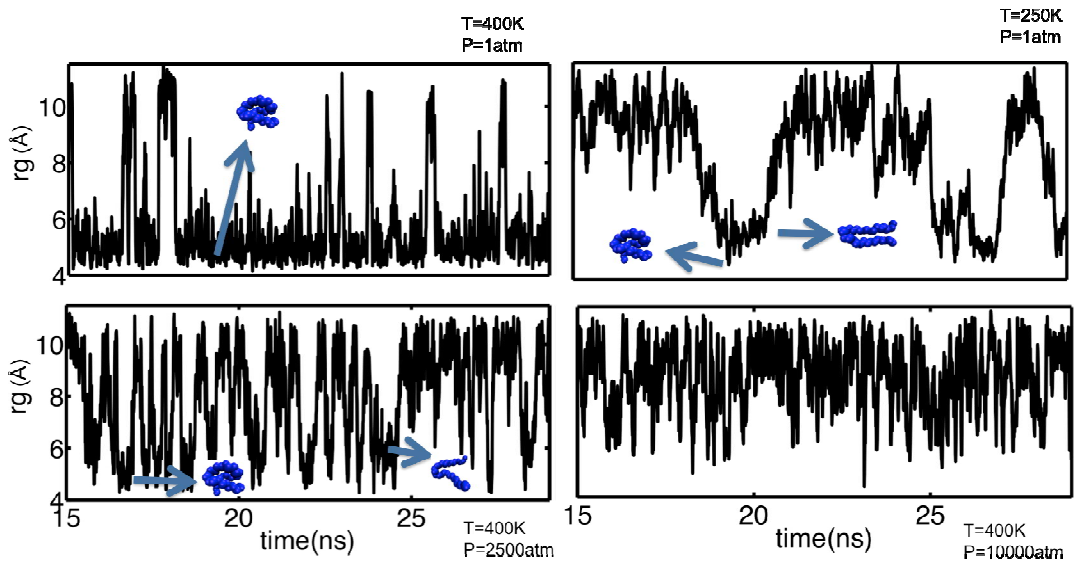

Figure S2: Radius of gyration of the polymer as a function of time at different pressures and temperatures. Only a portion of the trajectory is shown. Typical representations populated with different rg values are shown.

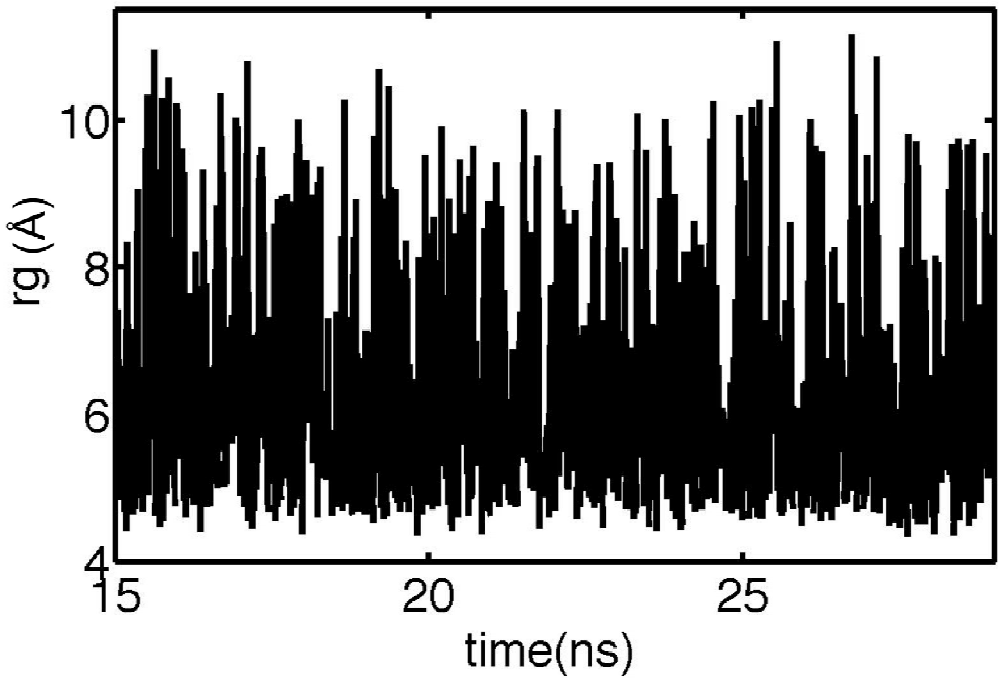

Figure S3: Radius of gyration of the polymer as a function of time at 800 K and 1 atm. Only a portion of the trajectory is shown.

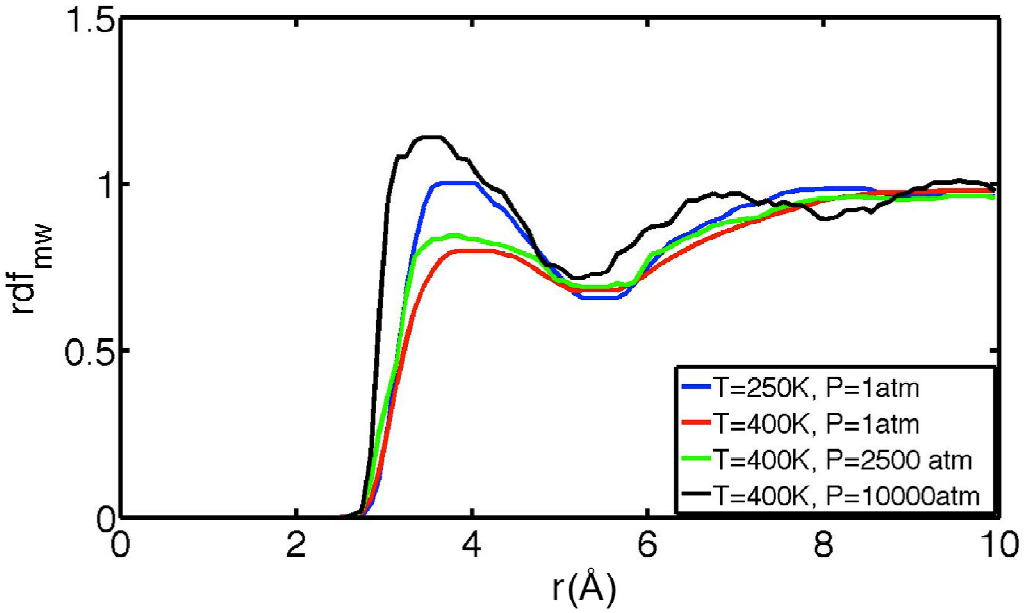

Figure S4: Monomer-water radial distribution function using only folded polymer conformations for a range of temperatures and pressures.

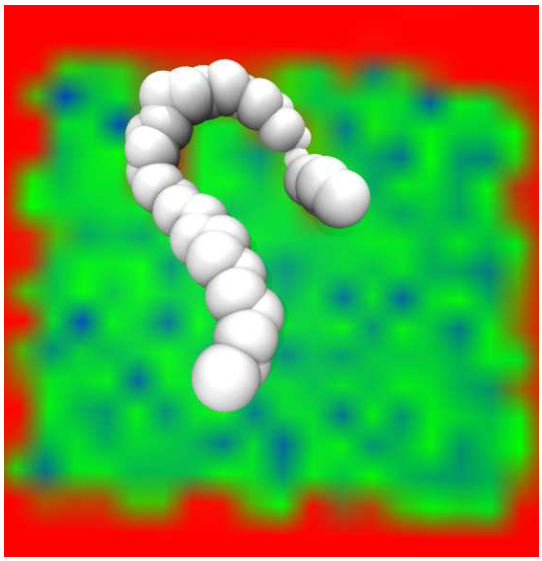

Figure S5: Water density map (red to blue: low to high) in the hydration shell for a typical hairpin conformation at T = 400 K and P = 10000 atm.

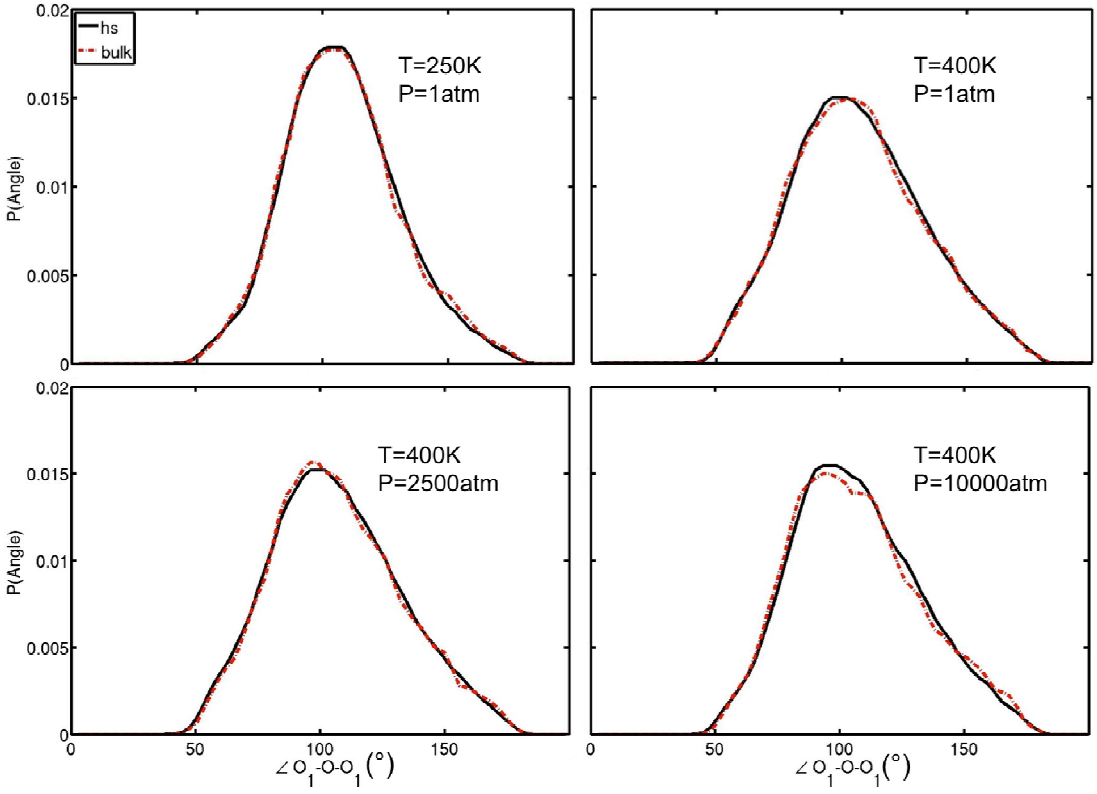

Figure S6: Angular distribution (<O1-O-O1) between the first nearest neighbor's water molecules at different temperatures and pressures. First neighbors are considered to be the 1st-4th closest neighbors. The angular distribution exhibits a single broad peak centered on the typical tetrahedral angle and high pressures and low temperatures marginally affect it.

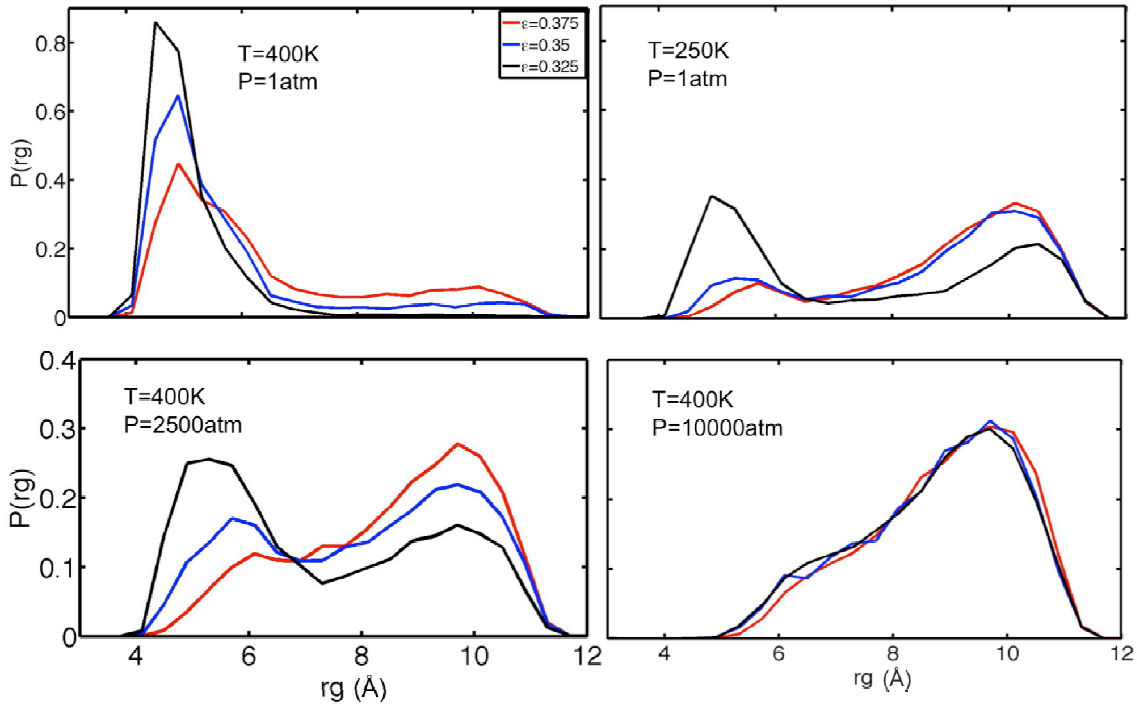

Figure S7: Normalized distributions of the radius of gyration (rg) of the hydrophobic polymer. The plots are displayed for different values of ε_{mw}, the interaction strength of the water-monomer attractions. For ε=0.35 kcal/mol, the intermonomer dispersive interactions equals the water-monomer attractions.