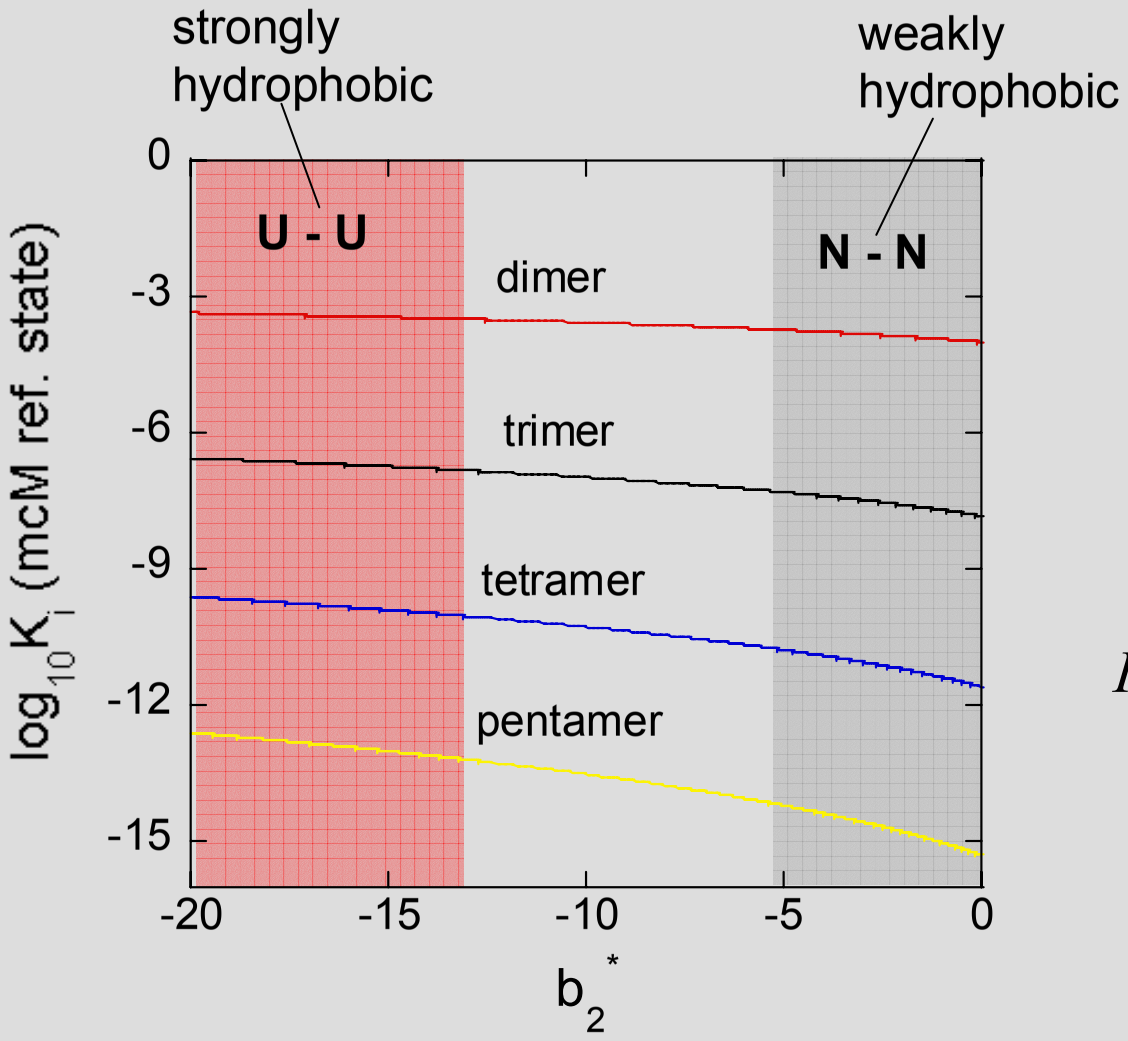
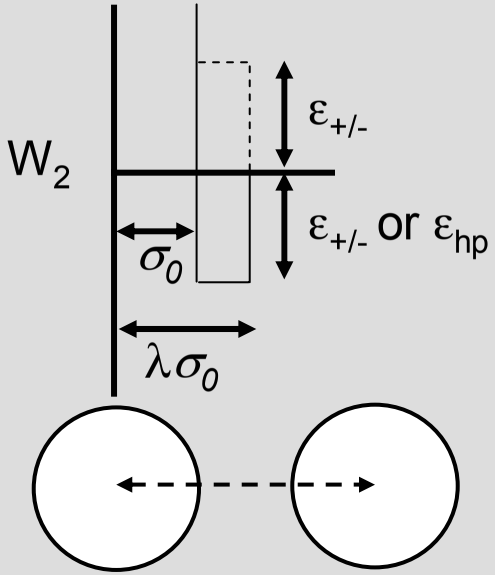
Cell-based theory provides accurate statistical thermodynamics of dilute solutions & basis for multi-scale simulations of dense fluids. Example below is for the free energy of cluster formation in colloid or protein solutions (ϕ < ca. 2%)





$$K_i \equiv \frac{C_i}{(C_{mon})^i} = \exp\left(-\frac{\Delta G_i^0}{k_B T}\right)$$

$$b_2^* \equiv \frac{B_{22} - B_{22}^{HS}}{B_{22}^{HS}}$$

Young and Roberts, *J. Chem. Phys.* (2007, in press)