

Chemical physics of polymer solutions

Exercise 7

12 January 2004

Consider a two-dimensional polymer melt (for example, a strongly adsorbed, one-monomer-thick layer of polymer). The melt is composed of two types of chains whose monomers are chemically identical. Chains of type A contain N monomers each, and chains of type B contain M monomers each.

1. Calculate the screening length introduced by the B chains for the correlations within an A chain. Can the A chains be assumed ideal?
2. For $M = N$, find the number of chains that penetrate the volume occupied by a single chain (the overlap parameter). Do the chains interpenetrate strongly? Can you explain this result on geometrical grounds?