P(BA-b-AN) copolymer

density of homopolymers (g/cm^3)

$\rho_{BA} := 1.11$ $\rho_{AN} := 1.17$

number of monomers in each block

$N_{BA} := 240$ $N_{AN} := 124$

degree of polymerization

$N_{av} := 2\sqrt{N_{BA} \cdot N_{AN}}$ $N_{av} = 345.022$

chemical composition of block monomers

molar mass (g)

charge

$nC_{BA} := 7$ $nC_{AN} := 3$ $mC := 12.01$ $Z_C := 6$

$nH_{BA} := 12$ $nH_{AN} := 3$ $mH := 1.0079$ $Z_H := 1$

$nO_{BA} := 2$ $nO_{AN} := 0$ $mO := 15.999$ $Z_O := 8$

$nN_{BA} := 0$ $nN_{AN} := 1$ $mN := 14.007$ $Z_N := 7$

molar mass of monomers

$m_{BA} := \left(nC_{BA} \cdot mC + nH_{BA} \cdot mH + nO_{BA} \cdot mO + nN_{BA} \cdot mN\right)$ $m_{BA} = 128.163$

$m_{AN} := \left(nC_{AN} \cdot mC + nH_{AN} \cdot mH + nO_{AN} \cdot mO + nN_{AN} \cdot mN\right)$ $m_{AN} = 53.061$

molar mass of blocks

$M_{BA} := N_{BA} \cdot m_{BA}$ $M_{AN} := N_{AN} \cdot m_{AN}$ $M_{tot} := M_{BA} + M_{AN}$

$M_{BA} = 30759$ $M_{AN} = 6580$ $M_{tot} = 37339$

molar volume of blocks

$V_{BA} := \frac{M_{BA}}{\rho_{BA}}$ $V_{AN} := \frac{M_{AN}}{\rho_{AN}}$

$V_{BA} = 27711$ $V_{AN} = 5624$ $\frac{V_{BA}}{V_{AN}} = 4.928$

this would not be a lamellar phase !!

I assume, numbers got mixed up:

$M_{BA} := N_{AN} \cdot m_{BA}$ $M_{AN} := N_{BA} \cdot m_{AN}$

$M_{BA} = 15892$ $M_{AN} = 12735$

$V_{BA} := \frac{M_{BA}}{\rho_{BA}}$ $V_{AN} := \frac{M_{AN}}{\rho_{AN}}$

$V_{BA} = 14317$ $V_{AN} = 10884$ $\frac{V_{BA}}{V_{AN}} = 1.315$

lamellar phase possible, but somewhat asymmetric

x-ray scattering

atomic mass unit $amu := 1.66053873 \cdot 10^{-24}$ (g)

amu per cubic Angstroem $\rho at_{BA} := \rho_{BA} \cdot \frac{10^{-24}}{amu}$ $\rho at_{BA} = 0.668$

$\rho at_{AN} := \rho_{AN} \cdot \frac{10^{-24}}{amu}$ $\rho at_{AN} = 0.705$

monomer charge

$Z_{BA} := \left(nH_{BA} \cdot Z_H + nC_{BA} \cdot Z_C + nN_{BA} \cdot Z_N + nO_{BA} \cdot Z_O\right)$

$Z_{BA} = 70$ $m_{BA} = 128.163$

$Z_{AN} := \left(nH_{AN} \cdot Z_H + nC_{AN} \cdot Z_C + nN_{AN} \cdot Z_N + nO_{AN} \cdot Z_O\right)$

$Z_{AN} = 28$ $m_{AN} = 53.061$

electrons per cubic Angstroem $Q_{BA} := \frac{Z_{BA}}{m_{BA}} \cdot \rho at_{BA}$ $Q_{BA} = 0.365$

$Q_{AN} := \frac{Z_{AN}}{m_{AN}} \cdot \rho at_{AN}$ $Q_{AN} = 0.372$

average charge density $Q_{av} := \frac{Q_{BA} \cdot V_{BA} + Q_{AN} \cdot V_{AN}}{V_{BA} + V_{AN}}$ $Q_{av} = 0.368$

scattering contrast $C := \frac{\left|Q_{BA} - Q_{AN}\right|}{Q_{av}}$ $C = 1.824\,\%$

low contrast !