

Abstract Submitted  
for the MAR10 Meeting of  
The American Physical Society

**On the Phase behavior of polystyrene-*b*-poly(methyl methacrylate) diblock copolymer<sup>1</sup>** JUNHAN CHO, Dankook University, HYUNGJU AHN, DU YEOL RYU, yonsei university, YOUNGMIN KIM, Hongik University — The phase behavior of polystyrene-*b*-poly(methyl methacrylate) (PS-*b*-PMMA) copolymers of various molecular weights has been studied by using small-angle X-ray scattering (SAXS) and depolarized light scattering (DLS). The empirical Flory  $\chi$ , determined from scattering intensity profiles for a fully disordered PS-*b*-PMMA copolymer, was shown to behave differently depending on temperature range.  $\chi$  was described mostly by enthalpic contribution at higher temperatures, but a dominant entropic contribution appeared in  $\chi$  at lower temperatures. The order-disorder transition (ODT) temperatures for the series of copolymers with the controlled molecular weights were directly measured through SAXS and DLS. The resultant ODTs were then compared with a compressible random-phase approximation theory to determine cross interactions between block components. It was found that effective  $\chi$  from theory is also mostly described by enthalpic contribution, which yields a moderate change in ODT upon the increase of copolymer molecular weight. In addition, we discussed the pressure response of the copolymer using  $\chi$  from theory.

<sup>1</sup>J.C. acknowledges the financial support from Korea Research Foundation and also GRRC program of Gyeonggi province.

Junhan Cho  
Dankook University

Date submitted: 16 Nov 2009

Electronic form version 1.4