# ORDER-DISORDER TRANSITION OF POLYISOPRENE-b-POLYISOPRENE DIBLOCK COPOLYMER SOLUTIONS

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Order-disorder transition in a polystyrene-block-polyisoprene diblock copolymer (PS-PI,the number averaged molecular weight Mn=45,000, heterogeniety index Mw/Mn=1.09) solutions under high pressure were investrgated by using small-anlge X-ray scattering. We used dioctyl Phthalate(DOP) as solvent. Figure 1 shows the change in the scattered intensity of the PS-PI/DOP with temperature at pressure P=30MPa. It was found that the scattered intensity decreases with temperature T. In particular, the drastical increase between T= 90.0 and 93.0 ˚C was found, indicating that the order-disorder transition temperautre (ODTT) is 91.5˚C. The ODTT increases with pressure. These facts suggested that the increase in the pressure enhaced the fluctuations and makes the diblock copolymer solutions more unstable. It is well-known that the thermal fluctuation effects causes changes in the nature of phase transtion of a symmetric block copolymer from the second-order to the first order transitoin. We checked whether the strength of this effects is affected by pressure. This effects surpresses the scattered intensity of the peak position. In order to check how this supression changhes with pressure, We plotted The inverse of the peak intensity (1/S(qm)) as a function of the inverse of temperature in Figure 2. Though the ODTT at each Pressure is different, each curves is well supreimposed, indicating that the pressure affects both ODTT the temperature range where the thermal fluctuation supresses the concentration fluctuations of the block coplymer solutions.

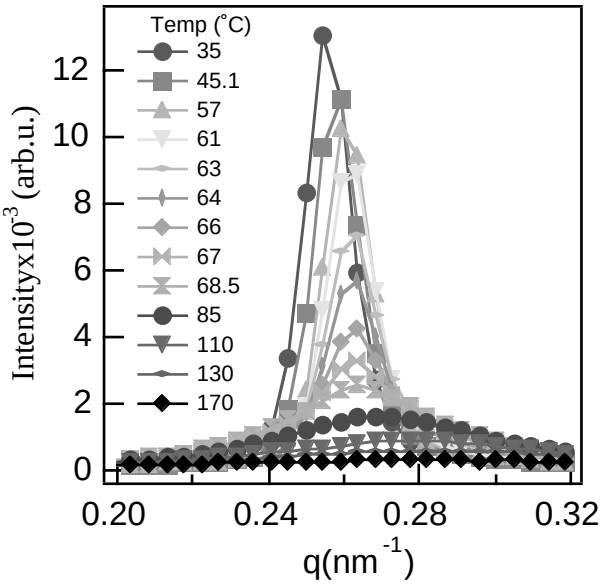


Fig.1 Temperature Dependence of scattered intensity for S-I/DOP at 30.0 MPa.

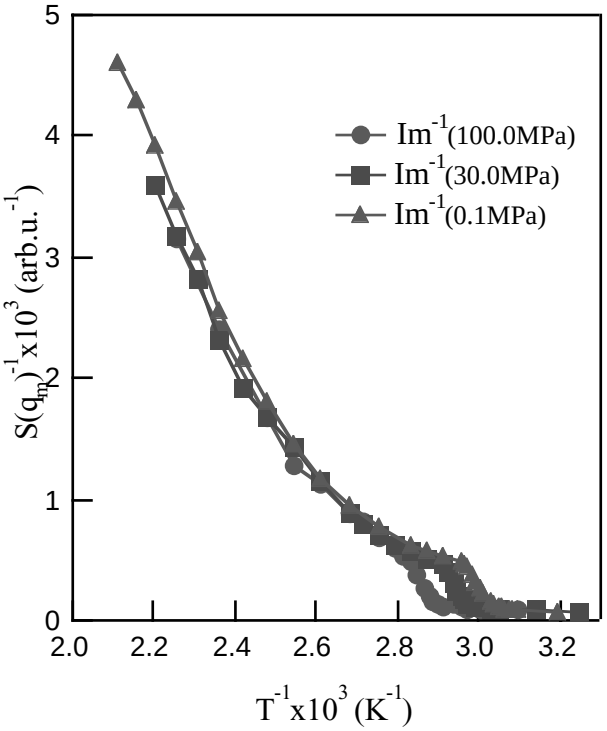


Fig.2 $S(q_m)^{-1}$ vs. $T^{-1}$