For 10% commercial polystyrene solution in toluene the viscosity values of this solution are nearly independent of the angular velocity $\Omega$, Fig.(6-13), . The first normal stress difference values measured by the eccentric spheres rheometer for the same solution are plotted in Fig.(6-14). In these curves , it is shown that the viscous curves are identical for $\varepsilon$=0.6 and $\varepsilon$=0.8 while in the case of viscoelastic curves the values are coincide very well for values of eccentricities up to $\varepsilon$=0.6 .

***Conclusion***

The new eccentric spheres rheometer based on the present theoretical work had been constructed . Two parameters of the viscoelastic fluids ; namely the shear viscosity $\mu$ and the first normal stress difference coefficient $[\alpha_2 + 2\alpha_1]$ can be determined by this rheometer .A good fitting between the theoretical and the experimental data has been shown for the present work and this fitting is coincide with the results in the texts . The high degree of symmetry of the present set up and the absence of the serious end effects may be considered as an advantage of the present rheometer . The first problem of the present set up is the small range of the eccentricities and its unacuracey . This unacuracy of the determination of the eccentricity had been avoided in the present case by making two eccentricities in opposite directions and then taking the average value .

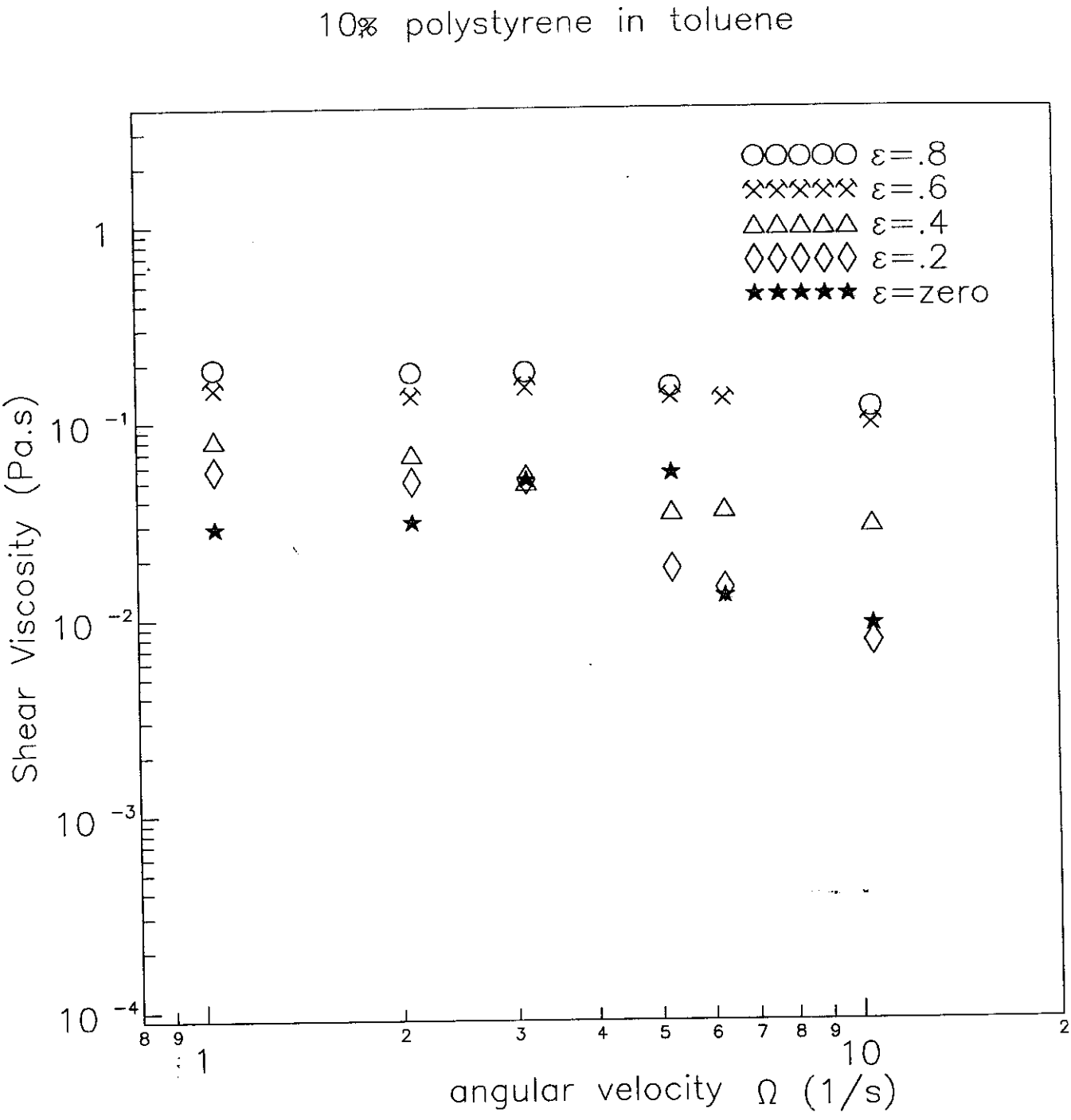


Fig.(6−13)The shear viscosity versus the angular velocity.

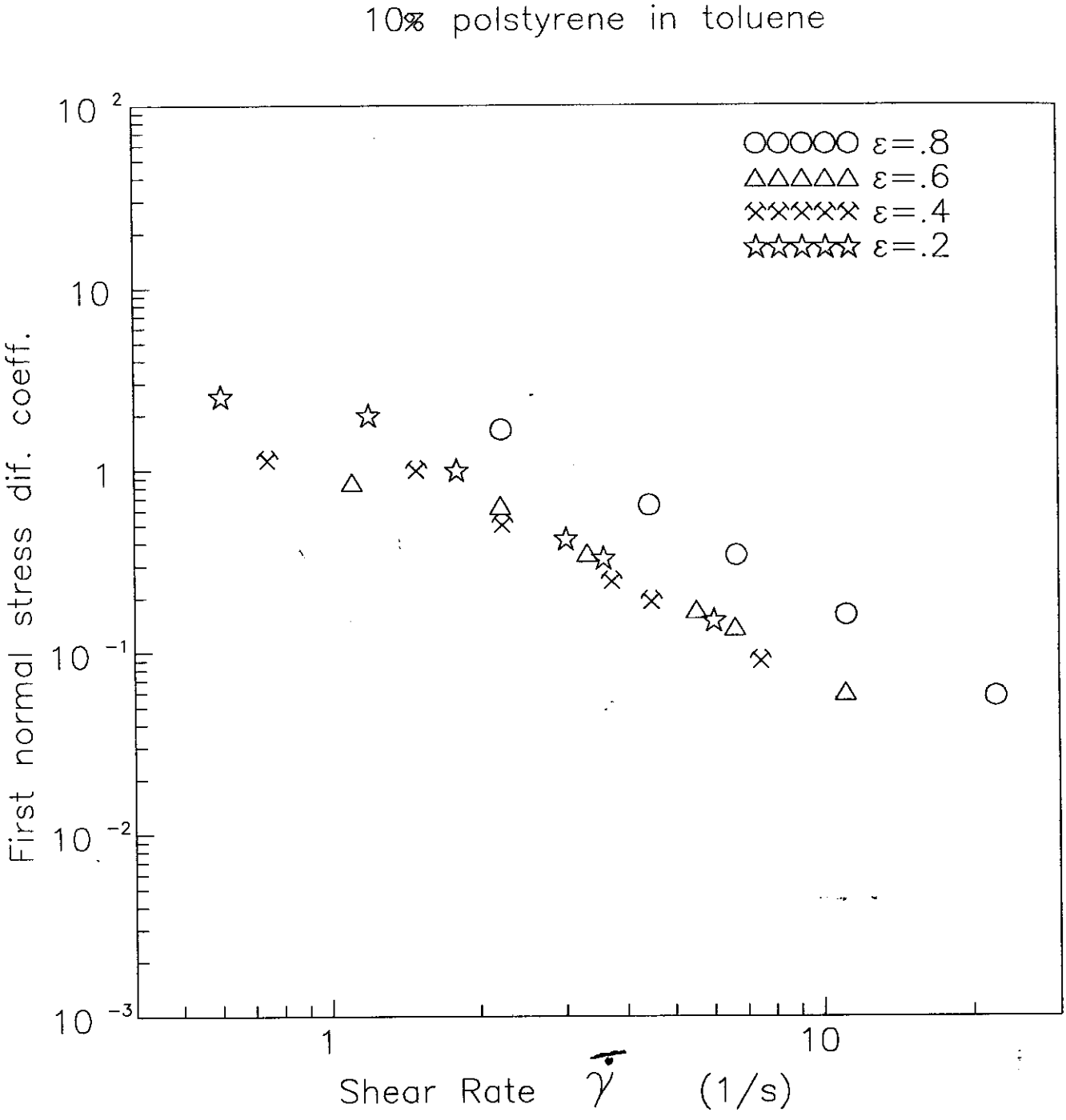


Fig.(6-14)The first normal stress difference coefficient versus the shear rate.