

Research Title                      Polymer - Polymer Compatibility Studies  
in Polymer Blends

Author                                      Mr. Tawatchai Puviwattana

M.S.                                         Teaching Chemistry

Examining Committee

Lecturer. Dr. Robert Molloy            Chairman

Lecturer. Dr. Nipapan Molloy           Member

Lecturer. Mr. Sutin Tepupatump       Member

### ABSTRACT

This work has been concerned with polymer compatibility studies of polystyrene (PS) with poly (2,6-dimethyl-1,4-phenylene oxide) (PPO) and poly (vinyl chloride) (PVC) with poly ( $\epsilon$ -caprolactone) (PCL). Blend samples were prepared as thin films cast from solution. For PS/PPO, toluene was found to be the most suitable solvent, while tetrahydrofuran was best for PVC/PCL. Slow, controlled solvent evaporation in a vacuum desiccator with the tap left open to the atmosphere produced films of optimum quality. The main analytical technique used to study polymer-polymer compatibility was the refractometric determination of the glass transition temperature(s) ( $T_g$ ). A clear PS/PPO (50 : 50 wt %) film exhibited a single  $T_g$  intermediate between those of PS and PPO, thus confirming their already well-known compatibility. Similarly, a clear film of the PVC/PCL (90:10 wt. %) blend also exhibited a single  $T_g$  indicating compatibility. Judging by film transparency, the conditional compatibility range for PVC/PCL appeared to be up to a limiting PCL content of about 40 % by weight. Finally, dilute-solution viscometry and thermogravimetric analysis (TGA) were examined as possible secondary methods of studying polymer compatibility. Although the results of these two methods were interesting when compared with those

of the respective homopolymers, their interpretation within the context of polymer-polymer compatibility is still unclear. Further, more detailed studies are proposed.



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