Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Reaction Kinetics at the Interface between Immiscible Polymers: Competition between Diffusivity and Reactivity[1] GUANGCUI YUAN, MINGJI WANG, CHARLES C. HAN, Institute of Chemistry, Chinese Academy of Sciences — Reactive blending processes at the interface between deuterated bisphenol-A polycarbonate (*d*PC) and amorphous polyamide (*a*PA) bilayer film were characterized by Fourier transform infrared (FTIR) and neutron reflectivity (NR). It was found that the aminolysis occurred during thermal annealing at 160 – 180 °C, inducing simultaneously scission of *d*PC chains and formation of *d*PC-aPA copolymer chains. Two or three stages of reaction kinetics as a function of time were probed by FTIR, depending on the competition between chain diffusivity and chemical reactivity for sample annealing at different temperatures. The late stage was controlled by potential barrier arising from previously formed copolymer, and it appeared earlier when annealing at 160 °C than that at higher temperatures. A phenomenon of transient interfacial instability which origin was ascribed to the mismatching in mobility of the polymer chains on either side of the interface was observed by NR. The copolymer once formed, remains localized at the interface and inhibits the diffusion of other reactive polymer chains still present in the bulk phase toward the interface.

[1] Chinese National Science Foundation (Project 21004069)

Guangcui Yuan
Institute of Chemistry, Chinese Academy of Sciences

Date submitted: 10 Nov 2011 Electronic form version 1.4