

ANNOUNCEMENT

Chemical Engineering/Bradford Chair Seminar

When: *Wednesday March 13, 2013 at 3:00 PM*

Where: *Livermore Center (LMC) 101*

Structure and Dynamics of Hydrogen Bonding Polymers

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Abstract:

Hydrogen (H) bonding in polymeric system often affects the rheological properties, e.g., viscoelastic relaxation times and elastic moduli increase with strengthening the H-bonding in the system. The effect of H-bond formation was examined on the rheological behavior for molten random copolymers, poly(vinyl acetate-co-vinyl alcohol), P(VA-OH), with various OH contents (f_{OH}). In this system, H-bonds between OH groups are mainly formed. Even for non-entangled low molecular weight samples of P(VA-OH) with $f_{OH}=60\%$ denoted as P(VA-OH60), showed plateau region at low frequencies in the storage modulus, due to the formation of H-bonding network structure, and the level of the plateau increased with decreasing temperature. Moreover, the equilibration process of the modulus after changing temperature was found to take long time and to have memory effect. The strength of network structure was also examined by non-linear rheological measurement (stress measurements under start-up shear flows) for the same sample. Shear-thinning behavior appeared, suggesting the breaking-up of H-bonding network by sheare flow. However, FTIR measurements under shear indicated that the change in the number of H-bonds was negligibly small.

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