Viscoelastic Behavior of Starch Plasticized with Urea and Glycerol

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Abstract. Dynamic mechanical analysis was used to study the viscoelastic behavior of thermoplastic corn starch samples plasticized with glycerol, urea and their mixture. Heterogeneity of the studied materials was inferred from the temperature dependences of the damping factor. Gradual release of chain segmental motion in particular regions of the heterogeneous system was observed in a wide temperature range for the urea-plasticized sample, while temperature ranges of relaxation processes in the glycerol-plasticized sample were partly overlapped. The response of the sample plasticized with the mixture of urea and glycerol to the harmonic force applied in the measured temperature range was strongly affected by hydration and mutual interactions between the plasticizers, which resulted in an overlap of temperature ranges for individual relaxation processes induced by temperature rise.