

An Analysis of Packaging Materials for an Energy-Efficient Wrapping System

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Abstract : Shrink wrapping is widely used as a method for secondary packaging to assemble individual items, such as cans or other consumer products, into single packages. This method involves conveying the packages into heated tunnels and so has the disadvantages that it is energy-intensive, and, in the case of aerosol products, potentially hazardous. We are developing an automated packaging system that uses stretch wrapping to address both these problems, by using a mechanical rather than a thermal process. In this study, we present a comparative study of shrink wrapping and stretch wrapping materials to assess the relative capability of candidate stretch wrap polymer film in terms of mechanical response. The stretch wrap materials are of oriented polymer and therefore elastically anisotropic. We are developing material constitutive models that include both anisotropy and nonlinearity. These material models are to be incorporated into computer simulations of the automated stretch wrapping system. We present results showing the validity of these models and the feasibility of applying them in the simulations.

Keywords : constitutive model, polymer, mechanical testing, wrapping system

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