P-11-1226

CELLULAR STRUCTURE POLYMERIC THIN FILM USING BIAXIAL STRETCHING TECHNIQUE

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The cellular structure of polymer films is the subject of several scientific works. Due to their lightness and flexibility, cellular polymeric thin films contribute to the enhancement of new technologies and development of plastic industry.
In this works, a polymeric film with cellular structure using biaxial stretching technique was used. The foam film was prepared in two steps: the prefoaming where a microcellular structure is obtained and enlargement of the previous cells with a biaxial stretching technique. First, the first foam was created with chemical agent in which we optimized the experimental conditions of mold preparation. Optimized parameters are: the amount of chemical blowing agent in polymer material blend, molds size, pressing conditions as temperature and pressure and finally cooling rate. The first foam optimized condition was selected to create stress concentration areas producing enlargement of foam cavities in the biaxial stretching process. In the second step of this work, biaxial stretching conditions was optimized in terms of stretching rate, softening temperature and stretching speed resulting ellipsoidal flattened cavities. The biaxial stretching equipment used in this work was developed at Laval University, Quebec, Canada. This system is composed of a mechanical tensile machine and transfer is mechanical uniaxial displacement to biaxial displacement. The thin cellular polymeric film was characterized by mechanical tensile machine, in preparation process. Cavities were characterized with Scanning Electron Microscopy (SEM), Transmission
Electron Microscopy (TEM) and Mercury Porosimetry Analyzer.