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Evaluation of multilayer polymer film obtained by developed blow molding process

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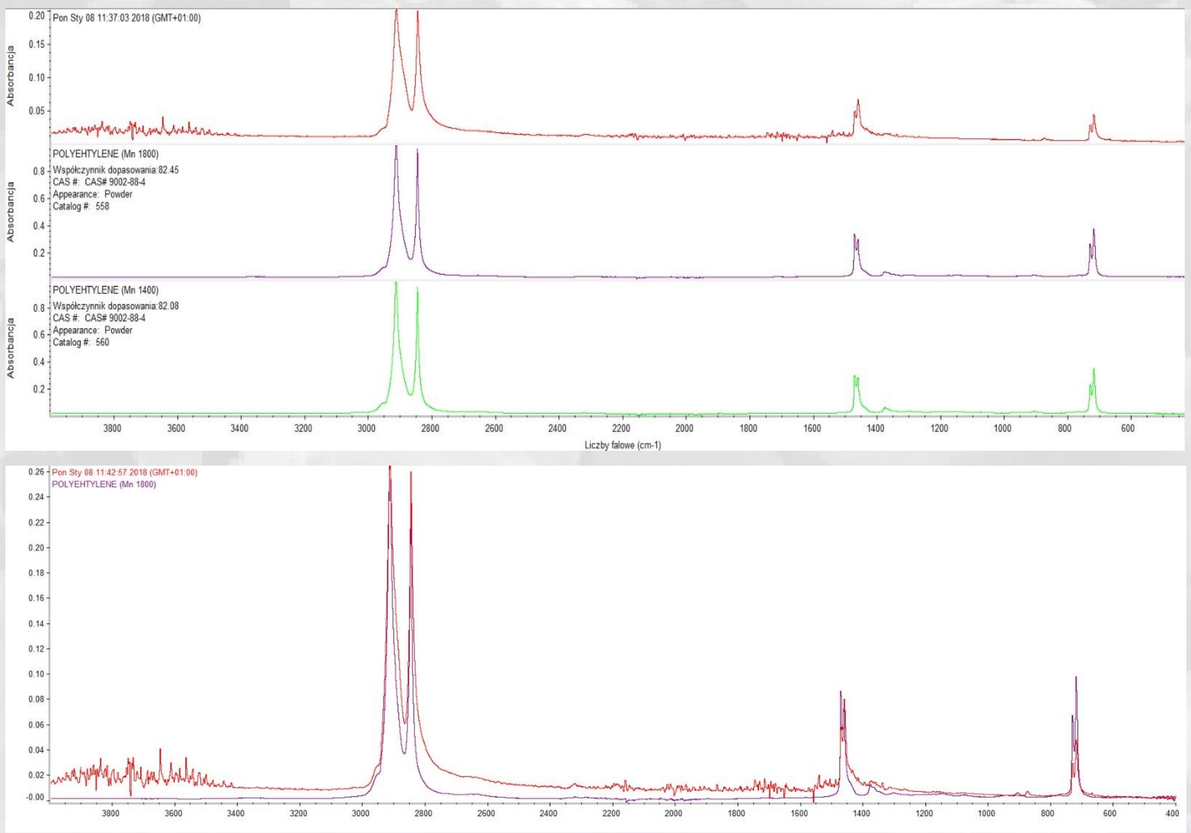
INTRODUCTION

The work focuses on obtaining of the composite in form of n-layer polymer film. Manufacturing of the film combine the advantages of individual layers in one production process to achieve multilayer composite. Particular stages of the work include performing samples of films with various matrix-filler compositions. Matrix materials has been used polyethylene. To develop structure unique blow molding system has been used to combine 3-layered film. To reinforce the film mineral filler has been used. Developed blow molding technology allows obtaining a multilayer film with different chemical composition thanks to the use of precise gravimetric dosimeters simultaneously on different extruders. This process ensures relatively easy processability and additionally with reinforcements may bring various and special properties i.e. resistance to UV radiation, increased mechanical, barrier and antibacterial properties.

MATERIALS

In the research has been used PE and PE filled with organic filler



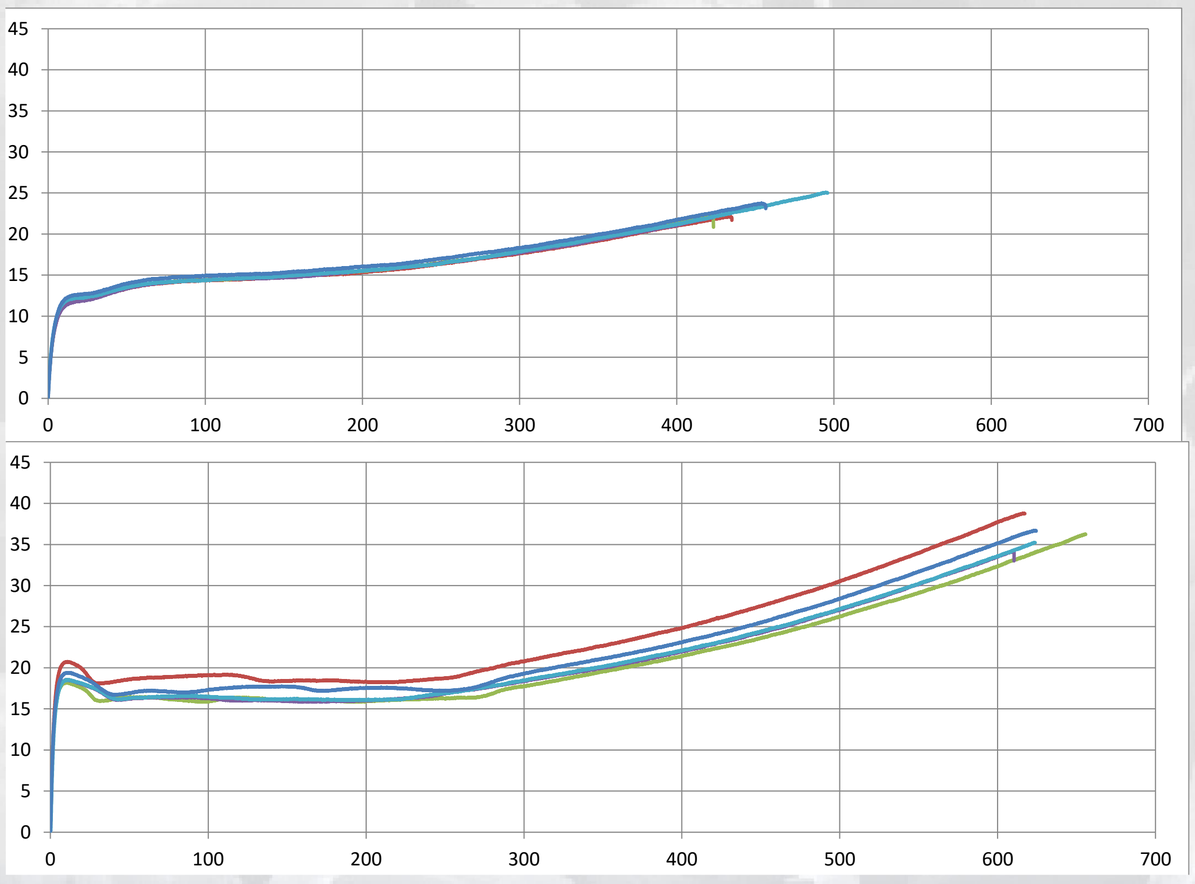
The FTIR spectrum of the tested 3-layer polyethylene film

EXPERIMENTAL

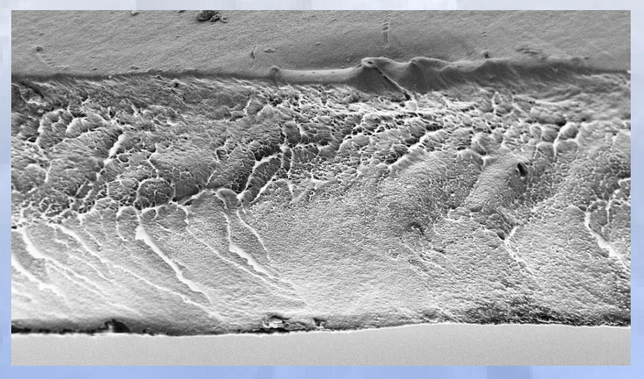
To the main stages of blow molding proces include:

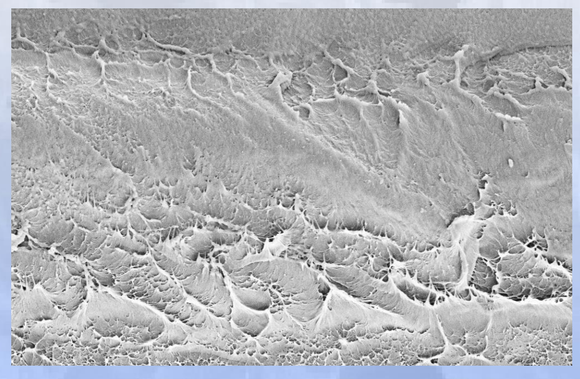
- Feeding the materials in the form of pellet from different feeders
- Transfer of material to the extruder throuh gravimetric feeder
- Transfer of air through the hole of the die
- Pulling the bublbe upwards from the die
- Cooling the bubble by the cooling ring onto the film

RESULTS



The tensile test results for 1- and 3- layer films





Mechanical tests show a difference in the tested films both in terms of maximum breaking strength and elongation. 3-layer films show higher tensile strength.