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## BLOWN FILM OF LDPE/HDPE BLENDS. II. MECHANICAL BEHAVIOR

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LDPE and HDPE were used to produce film of HDPE/LDPE blend system via film blowing extrusion. The Young's modulus, yield strength, yield strain, ultimate strength and strain at break of the films were studied through tensile test in both machine (MD) and transverse direction (TD) of film. Plot of engineering stress versus engineering strain revealed that as HDPE content in the films of blends declines the shape of stress-strain curve approaches that of neat LDPE film and strain-hardening behavior gradually fades. Young's modulus in the MD of the film blends with low LDPE content showed a synergistic behavior which is due to miscibility of the blends in the studied composition range. However, the Young's modulus in other compositions negatively deviate from the additivity rule of mixtures especially in low HDPE content, which might be due to immiscibility occurred in the films of the blends. Plot of the stress at yield is almost similar as that corresponds to Young's modulus. The tensile strength (TS) of the film blends did not change regularly over composition range. The TS of the films of blends containing high amount of HDPE was above that of predicted by the direct rule of mixtures, and a strong synergism was observed in the TS of the films of the LDPE/HDPE blends 5/95, but it was lower than the prediction of the simple additive rule in the films of blends with high LDPE content. Incompatibility and phase separation in the film blends cause a large number of weak interfaces and defects which can be a reason for lower TS of the films. Break strain in the MD of the films of predominant fractions of HDPE was higher compared to that of predominant fractions of LDPE. There is a significant improvement in the strain at break at 5 and 10% LDPE; this suggests synergistic effects at low LDPE compositions and is another indication of miscibility. The trend in the values of the yield stress, the tensile strength and the strain at break in the TD of the films versus composition was revealed similar.

Besides, the yield stress and the tensile strength in the TD of the film are very low and far from the reference line of the direct rule of mixtures, however the strain at break was rather close and below the line.