

Effects on mechanical properties of EPDM blends with difference thermoplastics

Bianca Prem^{a,b}, Robert Saf^a, Caterina Czibula^c, Ralf Supplit^d, Armin Holzner^d,
Claudia Mayrhofer^e, Christian Teichert^c, Gregor Trimmel^a

^a Institute for Chemistry and Technology of Materials, Graz University of Technology
Stremayergasse 16, 8010 Graz, Austria

^b Polymer Competence Center Leoben GmbH, Roseggerstraße 12, 8700 Leoben

^c Institute of Physics, Montanuniversität Leoben, Franz-Josef-Strasse 18, 8700 Leoben

^d Semperit Technische Produkte GmbH, Triester Bundesstraße 26, 2632 Wimpassing

^e Graz Centre for Electron Microscopy, Steyrergasse 17, 8010 Graz

Blending of different polymers is a well-established strategy to create new materials. However, the final materials properties depend strongly on the miscibility of the polymers. In this investigation, blends of elastomers (ethylene propylene diene monomer rubber -EPDM) and thermoplastics (polypropylene PP, polyethylene PE and PP/PE-copolymers) were prepared and mechanical properties as well as phase separation were studied. The mechanical properties on blends (hot molded at 190 °C, 35 bar pressure) were analyzed by standard tensile tests as well as dynamic mechanical analysis (DMA). The morphology – i.e. the phase separation - of the blend systems was investigated by atomic force microscopy (AFM) on sample blockfaces, prepared via cryo-ultramicrotomy. As an example, AFM phase images of measurements in tapping mode of a 5 x 5 μm^2 area are shown in figure 1. The bright phase is assigned to the softer elastomer and the correlation between the phase separation and the mechanical properties will be discussed in detail during the presentation.

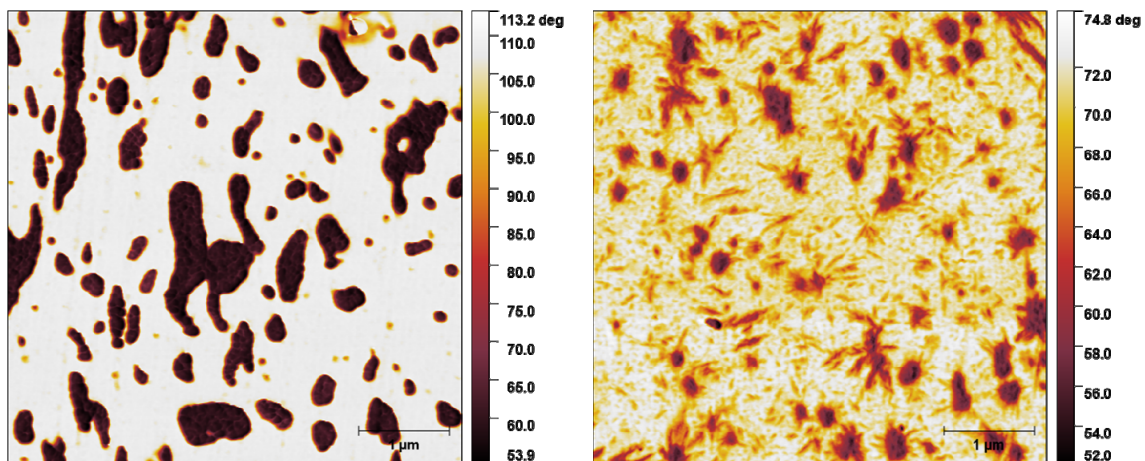


Figure 1: AFM phase images of left) EPDM:PP=80:20; right) EPDM:PE= 80:20