

## Stepwise behavior of surface properties in the filled polymer blend

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Polymer blends are widely used to obtain materials with improved characteristics. Interfacial tension (or surface energy) is one of the key parameters that determine the level of adhesion between the components of a polymer blend.

The composite under study is based on the polymer blend of PP/CPA and filled with Fe, which is localized only in the CPA phase. The study showed that concentration dependence of the free surface energy (FSE), like its dispersive and polar components, has stepwise behavior. The biggest changes of investigated characteristics are occurring in the phase inverse region (7-18 vol.% of Fe), where both phases PP and CPA-Fe are co-continuous. In this region, there is a sharp change in surface energy and its polar and dispersive components due to the rapid redistribution of the polymer phases of PP and CPA-Fe, both in volume and on the surface of the composite. In concentration intervals outside the region of phase inversion, the change in the values of FSE and its components is insignificant. Throughout the phase inverse region in the composite, there is a redistribution of the values of the polar and dispersion components in the total value of the surface energy. The relative contribution of the polar part increases from 1% to 14%, while the relative contribution of the dispersion part decreases from 99% to 86% in the evolution of composite morphology from the structure of PP-matrix with inclusions of CPA-Fe phase to a structure where the matrix is CPA-Fe with inclusions of the PP phase.

### Topics

Session A. Physics of condensed matter and spectroscopy

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