

**AKRILNITRILA –VINILACETĀTA KOPOLIMĒRA / VADAKSTES MĀLU SĪKDISPERSO
POLIMĒRU SISTĒMU IZPĒTE**
ACRYLONITRILE –VINYLACETATE COPOLYMER / ULTRAFINE VADAKSTE CLAY
DISPERSED POLYMER SYSTEMS

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Summary

The present investigation focuses on the incorporation of non-modified montmorillonite – (MMT) into acrylate copolymer made with acrylonitrile –vinylacetate (AVC) using solution blending and casting techniques. Ultrafine polymeric composites with different compositions were prepared and tested. Tensile, thermal and diffusion investigations were completed. Structure features of investigated material were determined by x-ray diffraction analysis. Glass transition and thermal degradation temperatures were detected.

Processing of ultrafine clay –polymer dispersed systems is one of many ways how to utilize recycled polymers and recover them to consumer appliances. Such dispersed systems are extraordinary materials that belong to the field of nanostructured polymeric composites. They are principally different to other recycling plastics due to incorporation of ultrafine, even nanosized particles to polymer matrix. Firstly, its successful nanolevel dispersion in bulk material provides main engineering properties enhancements, for example, strength, stiffness, barrier and flammability properties. Secondly, comparing with conventional recycled plastics, main performance properties of dispersed systems maintain in relatively high level owing to conservation of nanostructure elements and their potentially high reinforcing possibilities. However, traditional recycled polymers mostly show evident drop in properties that significantly narrow their application possibilities.

In recent years, many investigations have clearly shown that the use of the new class of polymer fillers – montmorillonite clays (nanoclays) - allow the overall gas and vapor permeability of polymer materials to be successfully decreased. Strengthening of barrier properties is mostly related to the enlargement of penetrant molecule pathway due to a more tortuous diffusion rounding along non-permeate clay platelets.

Thus, processing and properties of novel dispersed polymer –clay system based on acrylonitrile –vinylacetate copolymer and vadakste clay are investigated. Obviously, that influence of polymer, dispersed phase concentration and processing on final material structure –property correlation are very important and need to be carefully investigated. Our studies concern the preparation of different composition composites, determination of their structural peculiarities, mechanical and thermal properties as well as their permeability, diffusivity and solubility.

Investigation results show that chosen preparation technique – solution blending and casting, provides the development of the nanostructurally featured polymeric composites demonstrating significant improvements in main engineering properties. For example, elastic modulus, strength at break of composites is noticeably increased comparing to neat polymer. Permeability of the composites is also greatly changes –significantly decreases due to development of ordered lamina nanostructures.

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