THE PROPOSALS FOR COOPERATION

OF DEPT. OF PLASTICS AND BIOLOGICALLY ACTIVE

POLYMERS TECHNOLOGY OF NATIONAL TECHNICAL

UNIVERSITY “KHARKIV POLYTECHNIC INSTITUTE”

DEPT. OF PLASTICS AND BIOLOGICALLY ACTIVE POLYMERS TECHNOLOGY

Chief of dept. of plastics and biologically active polymers technology:

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The department prepares the Bachelors and Masters within the specialty "Chemical technology and engineering" in the following specializations:

1. **"Chemical technology of synthetic and natural polymers and elastomers",**
2. **"Chemical technology of polymer and composite materials"**

DEPT. OF PLASTICS AND BIOLOGICALLY ACTIVE POLYMERS TECHNOLOGY

The Department conducts investigations in the following areas:

1. THE CREATING FUNCTIONAL POLYMER COMPOSITE MATERIALS (PCM) WHICH HAVE STRONG ANTIMICROBIAL AND FUNGAL RESISTANCE PROPERTIES.

Summary of the project

Such polymer composite materials can be effectively used in medicine (dental and wound dressings, etc.), as well as in engineering in the form of products with high biological resistance to various microorganisms. It is essential for the polymers used in the conditions of high humidity, bacterial and fungi contamination.

Purpose of the project is the creation of functional PCM by modifying the surface of the fillers (filler-antiseptic, filler-stabilizer, filler-hardener, filler-accelerator of structuring processes, etc.).In addition, it is necessary to perform a series of studies to identify technological and operational properties of PCM.

DEPT. OF PLASTICS AND BIOLOGICALLY ACTIVE POLYMERS TECHNOLOGY

Department of plastics and biologically active polymers technology has the elaborations in this field that published in scientific journals:

1. **M. Suslin, O. Nedilko, D. Mishurov. The influence of alkylammonium modified clays on the fungal resistance and biodeterioration of epoxy-clay nanocomposites. International Biodeterioration & Biodegradation 110, 136-140, (2016).**

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2. THE USE OF SECONDARY POLYMERS, WHICH ARE CONTAINED IN MUNICIPAL SOLID WASTE IN MUNICIPAL SERVICES.

Summary of the project

This area can be of interest for researchers, because in addition to increasing the share of polymers in industry, they contribute to the protection of the environment.

Purpose of the project is the creation of polymer mixtures on the basis of secondary polymers, ensuring their thermodynamic compatibility, which contributes to the significant improvement of the mechanical properties of such PCM.

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Department of plastics and biologically active polymers technology has the elaborations in this field that published in patents:

1. **Pat. 98710, Ukraine, MKI C08G12/00. Polymer composition**

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3. THE CREATING OF NEW POLYMER ACTIVE LASER MEDIA FOR PHOTONICS AND OPTOELECTRONICS

Summary of the project

A very important photonics area is design and use of the new functional optically transparent materials with nonlinear optical (NLO) properties based on polymers and polymer composites, having also good thermal and long-term structural stability. Such NLO polymer materials can be obtained by electrical poling of cross-linked polymers.

Purpose of the project is investigations of the NLO properties of the polymers and polymer composites based on glycidyl derivatives of quercetin.

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Department of plastics and biologically active polymers technology has the elaborations in this field that published in scientific journals:

1. **D. Mishurov, A.Roshal, O.Brovko. Second-order polarizability and temporal stability of epoxy polymers doped with chromophore and with chromophore moieties in the main chain. Polymers & Polymer Composites. 23,121–128 (2015).**
2. **D. Mishurov, A. Voronkin, A. Roshal. Synthesis, molecular structure and optical properties of glycydyl derivatives of quercetin. Structural Chemistry. 27, .285-294 (2016).**
3. **D. Mishurov, A. Voronkin, A. Roshal, O. Brovko. Relaxation behaviour and nonlinear properties of thermally stable polymers based on glycidyl derivatives of quercetin. Optical materials. 57, 179-184 (2016).**

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- ✓ **The modification of surfaces of aluminosilicates to obtain of functional polymers with antibacterial properties and fungal resistance**
- ✓ **The Investigations in field of development of polymer mixtures based on secondary polymers for municipal services**
- ✓ **The creation of weatherproof polymer composite materials by modifying their surfaces**
- ✓ **The investigation and developing of nonlinear optical crosslinked polymers based on natural pigments for photonics and optoelectronics**