**ABSTRACT**

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**Title**: Influence of carbon, silicates and bentonite nanoparticles on the electrical properties of polymer composites

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The PhD thesis presents the results of studies on the influence of various types of nanoparticles on the electrical properties of nanocomposites with polylactide matrix and ethylene glycol based nanofluids. Possibilities of application of investigations of electrical properties of nanofluids as a criterion of selection of nanofiller material for polylactide matrix in order to prepare nanocomposite with increased electrical conductivity were also evaluated.

In the theoretical part of the thesis, the research of literature concerning preparation methods and physical and mechanical properties of nanocomposites based on thermoplastic polymers as well as on ethylene glycol based nanofluids was carried out. The most frequently used methods of preparation of this type of materials were discussed and the current state of the art about their thermal, mechanical, and electrical properties was also summarized.

The experimental part presents the characteristics of the materials used and discusses the methodology of the research. In order to evaluate the effect of selected types of nanoparticles on the electrical properties of nanofluids and to determine the possibility of using this type of research as a criterion for the selection of fillers for the preparation of polylactide based nanocomposites with increased conductivity, nineteen types of nanofluids containing from 1 to 5 wt. % of nanoparticles in ethylene glycol were prepared. Based on obtained results of the electrical conductivity measurements of prepared nanofluids and taking into account the economic factors and the impact of the selected materials on the environment, four types of nanoparticles with the highest influence on the electrical properties of ethylene glycol were selected for further studies. Using the melt blending method, four types of polylactide based nanocomposites with content from 1 to 15 wt. % selected nanoparticles were prepared. The samples of composite materials were subjected to fractographic studies and the influence of the content and type of nanoparticles used on the electrical properties of the prepared nanocomposites was determined.

The effect of the type and content of nanoparticles on the electrical properties of ethylene glycol based nanofluids and polylactide based nanocomposites was evaluated. The possibility of application of the study of electrical properties of nanofluids as a preliminary criterion for selection of the type of nanofiller for the preparation of thermoplastic polymeric nanocomposites with increased electrical conductivity was also determined.