



## Study of the Structure and Antimicrobial Properties of Composites based on (met)acrylates

K. Młynarczyk<sup>a,\*</sup>, B. Podkościelna<sup>a</sup>, M. Jaszek<sup>b</sup>

<sup>a</sup>*Department of Polymer Chemistry, Institute of Chemical Science, Faculty of Chemistry, Maria Curie-Skłodowska University in Lublin*

<sup>b</sup>*Department of Biochemistry and Biotechnology, Maria Curie-Skłodowska University in Lublin*

[\\*Karolina.mlynarczyk@mail.umcs.pl](mailto:Karolina.mlynarczyk@mail.umcs.pl)

There has been a steady increase in demand for functional materials for applications not only in public buildings, but also in households. The common use of antibiotics has contributed to antibiotic resistance among many strains of bacteria and fungi. A solution to this problem may be the synthesis of composites with antimicrobial properties. The materials produced will be able to be used as coatings for cabinets, countertops, handles, handrails, or housings for medical equipment. The use of these innovative materials, due to their properties, will save time associated with systematic disinfection. It will also significantly reduce the spread and multiplication of fungi and bacteria on such protected surfaces.

The main objective of the study was to synthesize new composites based on bisphenol A dimethacrylate with the addition of active diluents such as 2-ethylhexyl acrylate, methyl methacrylate, 2-hydroxyethyl methacrylate and an additive in the form of benzethonium chloride as a filler, which has antimicrobial properties confirmed in the literature<sup>1,2</sup>. In order to confirm the chemical structure, ATR-FT/IR analysis of the obtained composites was performed. DSC studies were also carried out which made it possible to evaluate the thermodynamic effects occurring in the samples during heating. Modifying the diffusion-circulation and successive dilution methods, the antimicrobial properties of the composites were determined. The possibility of biofilm formation on the surface of the obtained materials was also analyzed.

**Keywords:** cross-linked polymer composites, methacrylates, biofilm formation, antimicrobial properties

### References:

1. Łyszczek R., Podkościelna B., Lipke A., Ostasz A., Puszka A., Synthesis and thermal characterization of luminescent hybrid composites based on bisphenol A diacrylate and NVP *J. Therm. Anal. Calor.* **2019**, 138, 4463-4473, DOI: 10.1007/s10973-019-08914-1