BIOCIDAL ACTIVITY OF HYDROPHOBICATED OLIGOHEXAMETHYLENUGANIDINES IN EPOXY SYSTEMS

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Long-term usage of antibacterial and antifungal agents may cause resistance occurrence of many bacteria and parasitic fungi to active substances. That is why new antimicrobial derivatives development is up-to-date problem. Among modern microbial-resistant materials the group of oligohexamethyleneguanidines (OGMG) is of special interest, because it is promising additive for various polymer materials. The purpose of the study was to modify the epoxy-amine systems by OCMG derivatives, and to investigate general thermophysical properties and biocidal activity of the cured materials as well.

The main objects of the study were epoxy epoxy resin (ER) Epikote 828 with $M_n = 375$ (Hexion, USA) and polyglycidyl ether of oligooxypropylene triol Laproxide 703 with $M_n = 732$ and $f_{EP} = 2.43$ (Macromer, Russia); OGMG palmitate and stearate synthesized from OGMG hydrochloride ($M_n = 951$, branching coefficient equals 0.47 equivalents per mole. OGMR salts — ER adducts were synthesized in autoclave at manometric pressure of 4 atm for 2 hours. The synthesis products were introduced into epoxy-amine mixture, after that curing process was carried out till fully cross-linked polymer was obtained. Further experiments samples (films) were prepared by coating technique. Glass transition temperature evolution of curing systems with variable OGMG content was analysed; the polymer products thermal stability and some mechanical characteristics were evaluated. Fully cured films antibacterial activity was verified by MTT assay. Samples were held for a week in inoculated by P. putida K12 strain nutrient medium (based on the yeast extract, tryptone and dextrose) and biocidal response was detected. The study results had demonstrated the perspectiveness of hydrophobized OCMG modified epoxy-amine polymers employing as antibacterial materials.

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