

DIRECTIONAL REGULATION OF THE FIRE-PROTECTIVE AND EXTINGUISH EFFICIENCY OF N–P-CONTAINING FIRE RETARDANTS IN SYNTHETIC AND NATURAL POLYMERS

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Abstract: The thermal, physicochemical properties of synthetic nitrogen-phosphorus-containing flame retardants and the quantitative content of nitrogen and phosphorus in fire-protected carboxy-, heterochain polymers (polypropylene, polyethylene, and polyurethane) and forest combustible materials (wood and peat) were investigated. The dominant process in the flame retardant mechanism for stopping the combustion of different nature synthetic and natural polymers is established — a sufficient yield of volatile combustion inhibitors to the flame zone which coincides with the temperature transformations of the polymer matrix. It is shown that the synergism of nitrogen-phosphorus-containing flame retardants, regardless of the nature of the polymer matrix, consists both in the participation of phosphorus in the formation of condensed organomineral thermally insulating structures and in the participation of nitrogen, mainly, in the inhibition of radical processes in the flame zone. The obtained information allowed to control the fire-retarding properties of fire retardants at the synthesis stage by changing the composition and ratio of the components of the reaction mixture.

Keywords: combustion inhibitors; flame retardants; nitrogen-phosphorus-containing; synergism; polyolefins; polyurethane foam; wood; peat

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