

POLITECHNIKA ŚLĄSKA
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PRACA DOKTORSKA

Badania nad utlenianiem polipropylenu do wosków polarnych

Study on oxidation of polypropylene to polar waxes

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Studies described in this paper concern the elaboration of technology of obtaining polypropylene waxes polar by oxidation (oxidation degradation) of powdered polypropylene with oxygen or air below the melting point.

The polar waxes with oxygen-containing groups (carboxyl, carbonyl, ester, etc.) can be used in production of aqueous emulsions, adhesives, pigments, paints and building materials.

The study was carried out in two reaction systems: gas - solid and a gas - solid - liquid phases (aqueous dispersion), using different types of reactors: tank with a mixer, fluidized bed, a stirred autoclave.

Depending on the reaction system, the scope of research enclosed to determine the effect of: temperature, pressure, flow rate of oxidant (air, oxygen, oxygen-enriched air), the mixing speed and chosen additives (initiator, transition metal compounds and ozone) on the course of process and properties of products. The waste polypropylene was proposed as a raw material.

The obtained products were compared with polar waxes produced by leading manufacturers. They were also used for the preparation of aqueous emulsions and adhesives.

The process of polypropylene oxidation in aqueous dispersion was chosen as the most preferred. For this process, the preliminary simplified technological guidelines for pilot plant were prepared.