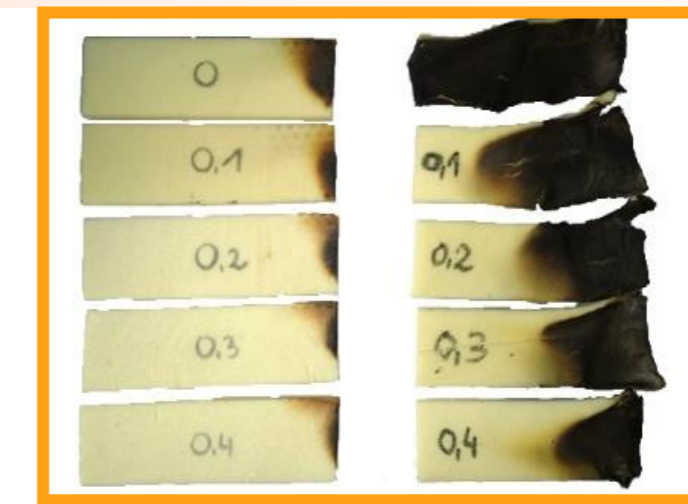


FLAME-RETARDANT BIO-POLYOL BASED ON WHITE MUSTARD (*SINAPIS ALBA*) SEED OIL DEDICATED TO PRODUCTION OF RIGID POLYURETHANE FOAMS FOR CIVIL ENGINEERING

Introduction

Polyurethanes (PUs) belong to thermal insulation materials in which dynamic development has been observed over the last ten years. Currently, research is aimed at obtaining new "green" raw materials for production of PUs from renewable sources (e.g. from vegetable oils) and the production of materials with low flammability. These actions are in line with the doctrines of sustainable development and Green Chemistry. This is related to the replacement of petrochemical raw materials by materials of renewable origin (polyols based on white mustard seed oil), as well as the ecological aspect (replacement of toxic flame retardants in foams by substances that do not have a negative impact on the environment).



Samples after burning tests



Polyurethane foams

Invention idea

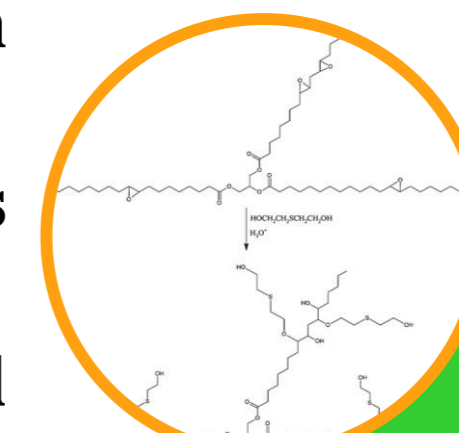
The invention relates to the technology and production of new bio-polyol raw materials containing heteroatoms of sulfur belonging to the group of flame retardants elements. The presented invention is an environmentally friendly solution, the idea of which is to process unrefined white mustard (*Sinapis alba*) seed oil into a bio-polyol raw material, and use it to obtain fire-safe polyurethane materials dedicated to the civil engineering.



Bio-polyol

Advantages of the invention

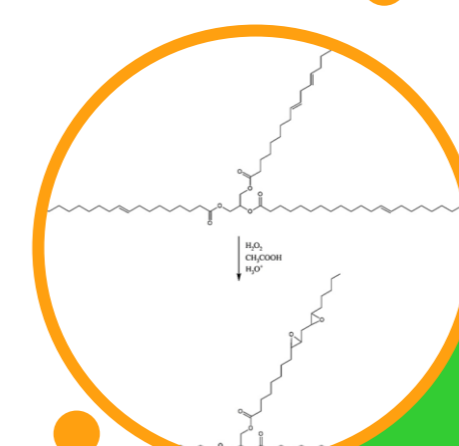
- the "ECO" aspect - limiting the consumption of petrochemical raw materials from the processing of crude oil in favor of renewable raw materials, as well as replacing toxic flame retardants in foams by substances that do not have a negative impact on the environment;
- the "BIO" aspect - the processing of white mustard seed oil results in the production of a bio-raw material, which perfectly fits the doctrines of sustainable development and Green Chemistry;
- universality of this technology - possibility of obtaining various polyurethane materials based on synthesized bio-polyols;
- economical aspect - polyols based on white mustard oil are cheaper than petrochemical polyols.



Ring-opening reaction

Application possibilities

- civil engineering - thermal insulation, construction, filling and sealing materials; adhesives; protective coatings;
- furniture industry - flexible foams (upholstered furniture, mattresses, seats);
- automotive industry - bumpers, soundproofing, seats;
- clothing industry - shoe soles and leather imitation products;
- mining - sealing materials and covering of running elements.



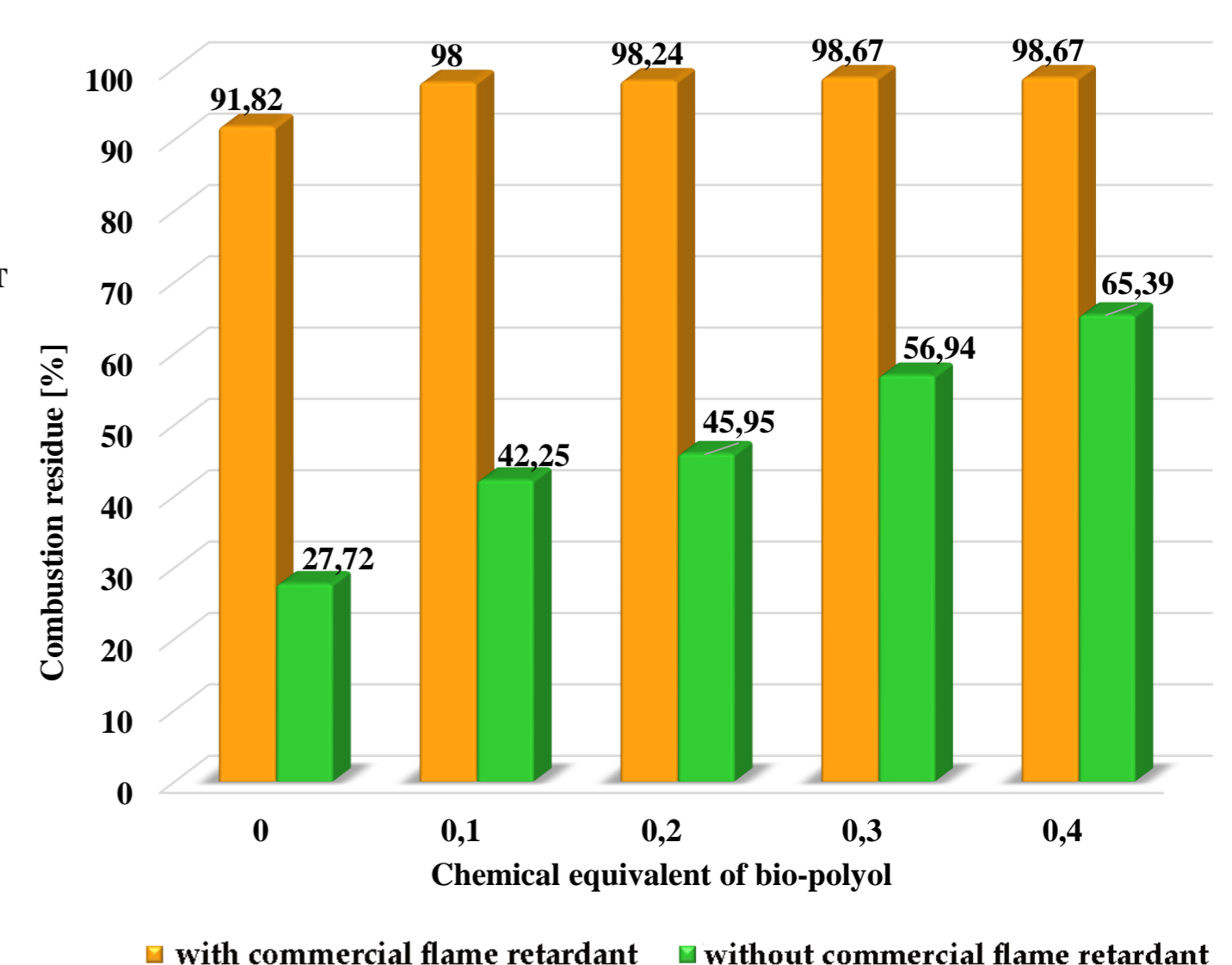
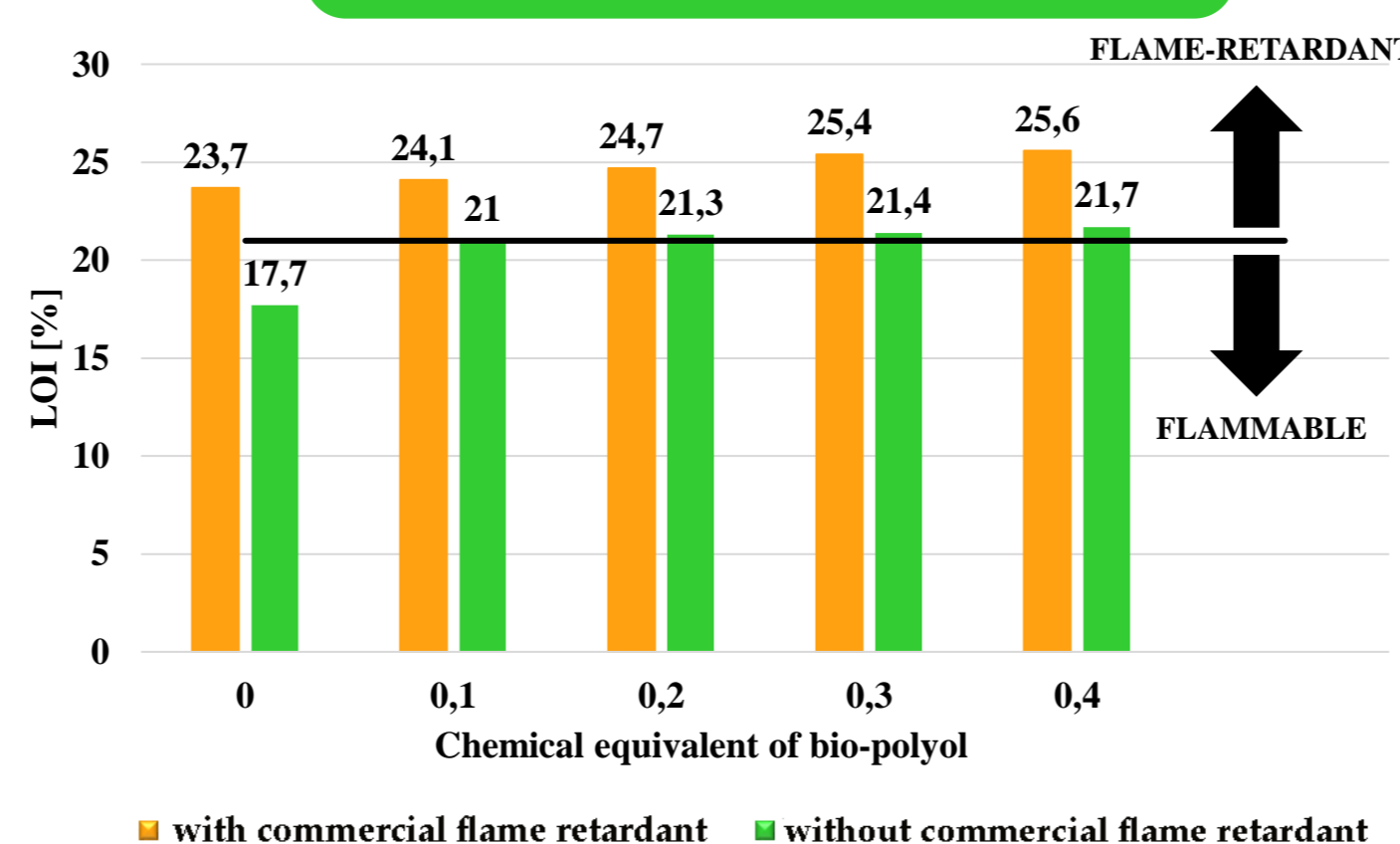
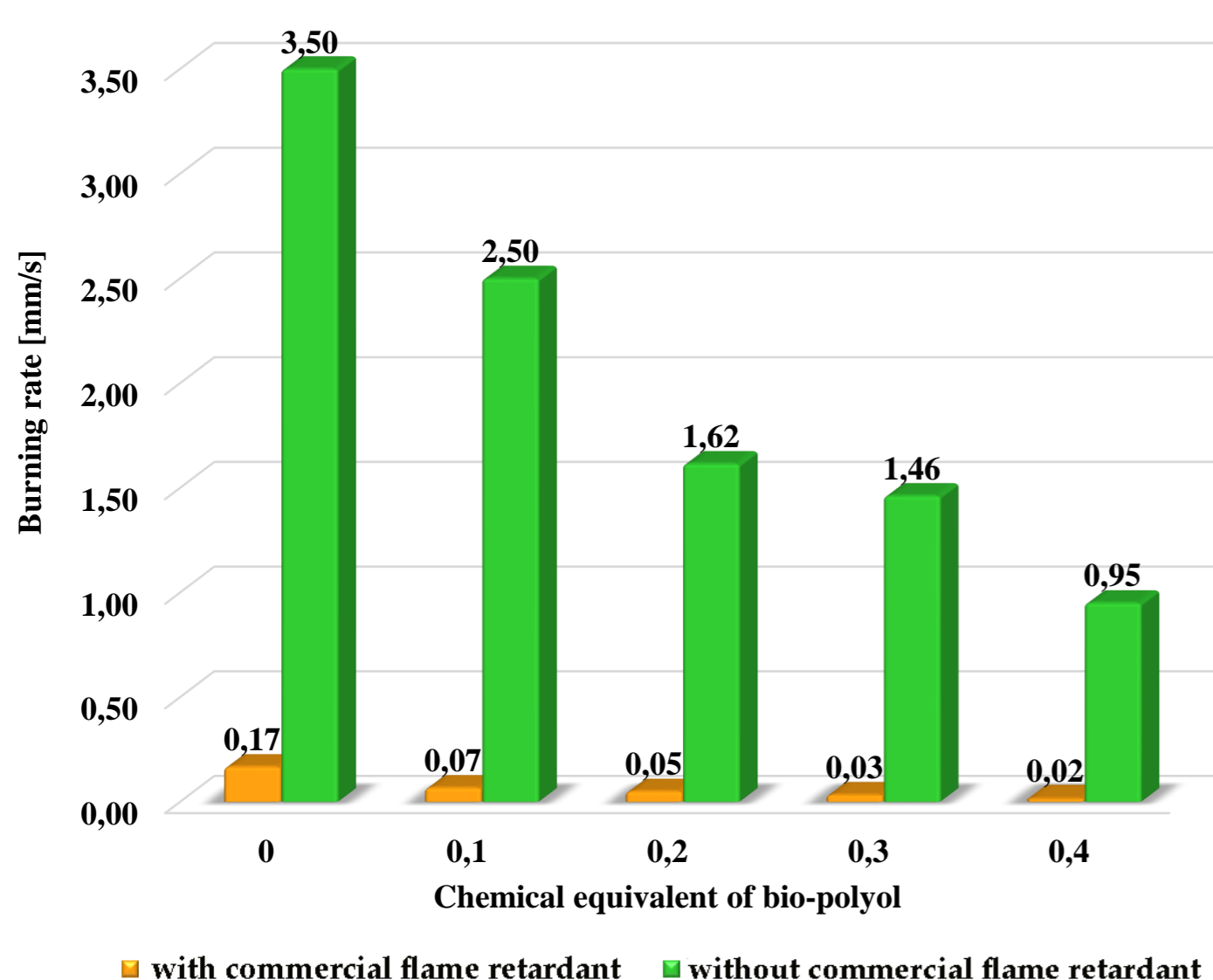
Epoxidized mustard oil



White mustard seed oil



White mustard seed



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