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Responsible Chemistry

BIO4 PRODUCTS
Creating sustainable resources for process industry

Resins and moulding compounds from pyrolytic lignin

Bio-based products for insulation foams and moulding compounds

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Webinar

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 723070.

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Hexion's work with lignin

Lignin characterization

- Various analytical methods for the characterization of lignin were developed

Lignin screening tests

- Lignin from different feedstocks were screened

Resin screening tests

- Lignin was introduced in different resins of different applications

Resin application tests

- Application tests of the resins were performed in our labs

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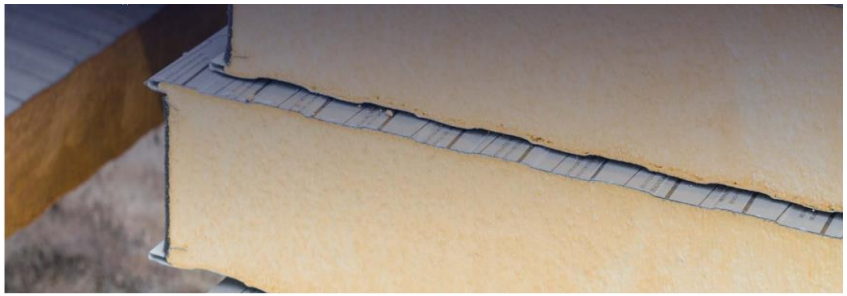
Hexion's work with lignin

Two different applications could be identified

1st application:

foams for the insulation market



2nd application:

moulding compounds

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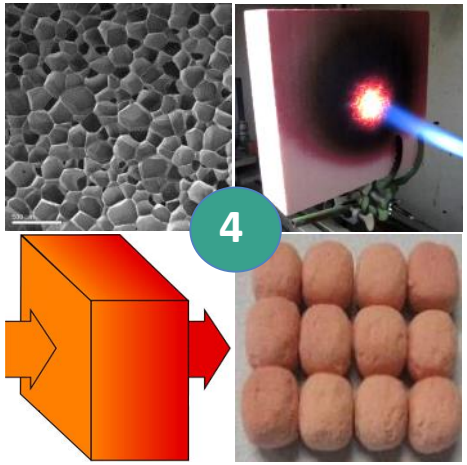
Development of insulation foams

- Synthesis of the new resins

- Mixing of new resin with different additives
- Curing in a heated mold

- Getting a foam panel



- Tests like opened cell content, fire test, thermal conductivity λ, friability test etc.

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Development of insulation foams

- Identified the most suitable lignin types (feedstocks) for insulation foams
- Best lignin in ranking leads to foams with good properties
- Lower ranked lignins lead to foams with poorer properties
- Different substitution grades were tried
- Lignin-based resins and foams are darker

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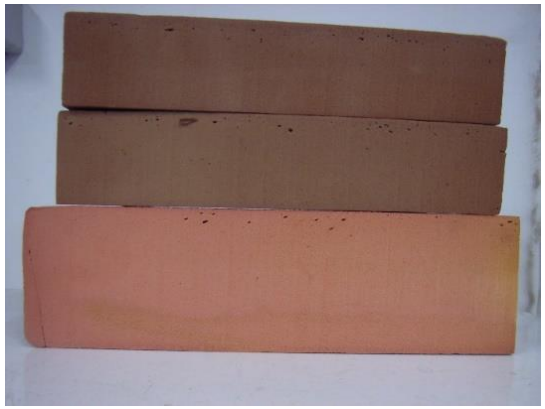
Development of insulation foams

Foam properties, 10 % substitution

- Improved reaction and resistance to fire
- Improved compression strength
- Improved elastic modulus
- Other properties maintained at excellent values
- The cross section: even structure with no big holes



Proof of principle

- Scale-up from laboratory to pilot plant
- Resin and foam passed the tests

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Development of moulding compounds

- Possible applications: e.g. automotive industry or household
- Tension rods were obtained from the lignin modified granulates
- Even without dye it has from the customer wanted dark color
- Excellent mechanical properties

injection moulding →

← injection moulding

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Why to start?

The new bio-based resins offer potential for

- Lower dependence from fossil resources
- Novel characteristics and features by lignin introduction into the resin
- Improved properties
- Sustainability benefits
- Bio certification could possibly be obtained
- Offer customers new innovative products

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Thank you for your attention

Further questions?

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