

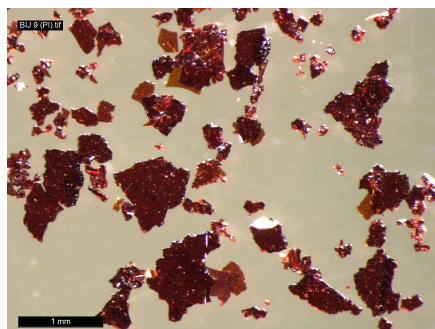
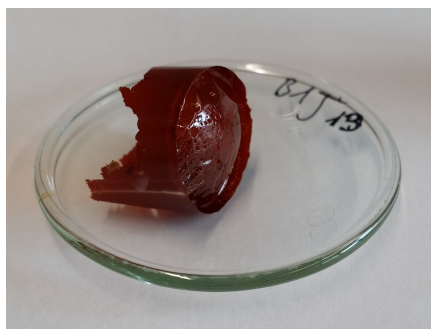
TECHNOLOGY OFFER

Processing of polyimide films and fibers from aqueous solutions

A new, environmentally friendly way to process polyimides has been developed. The process uses monomer combinations that are water-soluble over a very broad concentration range. Therefore, polyimides can be processed into e.g. films and fibers using only hot water as a solvent. This new method lies in stark contrast to conventional polyimide processing that requires hazardous and harsh solvents such as N-methyl-2-pyrrolidone (NMP).

BACKGROUND

Polyimides (PIs) are high-performance polymers showing high thermal stability, combined with other characteristics, such as low dielectric constants (i.e. electrically insulating properties) and radiation resistance. Therefore, PIs find broad applications in the electronics and aeronautics sectors. Unfortunately, once fully cured most PIs cannot be processed further. Therefore, the conventional creation of PI films and fibers requires prepolymer solutions in harsh, toxic and environmentally harmful solvents which are processed into the desired form, and followed by curing (polyimide generation by heating and solvent removal at high temperatures).



TECHNOLOGY

A new method to enable processing of polyimides in aqueous solutions has been developed. In terms of process parameters the technique is comparable to classical polyimide processing that takes place in toxic solvents such as NMP or dimethylformamide (DMF). However, our new method does not require any toxic solvents or catalysts, but uses solely high-temperature water. Moreover, the viscosity of the aqueous precursor solution can be adjusted over a wide range, which allows for straightforward adaption of our system to existing machinery.

BENEFITS

- Green processing without the need for toxic solvents and catalysts, enabling the creation of polyimide films and fibers.
- Viscosity of the aqueous precursor solution can be adjusted over a broad range.
- Low energy consumption as water is easier to remove than e.g. NMP or DMF.
- Applicable to a wide range of monomers.

REFERENCE:
M011/2016

POTENTIAL APPLICATIONS

Membrane technology /
Insulating materials for
electronics / Automotive
sector / Plant
engineering /
Aeronautics / Sports
equipment

KEYWORDS:
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IPR:
patents pending

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