Compatibility of Elastomers with Pyrolysis Oils

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Motivation

Pyrolysis oils can be used as a blending component in diesel or jet fuels. Adding a blend component to fuels has the advantage of conserving fossil resources. In addition, pyrolysis oils are obtained from waste plastics, whereby a waste product is recycled into usable energy. To ensure the use of the fuel mixtures in established systems, the compatibility with seals and hoses used in the automotive industry must be investigated. Nitrile butadiene rubber (NBR) elastomers often used as sealing materials due to their entropy-elastic behavior and high resistance to fuels and oils.

Proceedings

For this purpose, test specimens of NBR elastomers are stored in pyrolysis oils and pyrolysis oil-fuel mixtures for different time intervals. In this way, diffusion processes can be studied and the time profile of liquid absorption can be determined. The pyrolysis oil is produced in a pyrolysis plant using different reactant compositions (polypropylene PP, polyethylene PE and polystyrene PS). In addition to sorption tests, basic characterization of the pyrolysis oils, fuel blends, and elastomers will be performed.

Sorption Experiments

Use of different:
- Elastomers
- Storage temperatures
- Pyrolysis oils / fuel blends

Storage in an autoclave:
- Construction
- Test setup
- Pre-Tests

Analysis

Method development for
- GC/MS
- GCxGC/MS
- IR und NMR Spektroscopy

Measurements of
- Mass/Volume change
- Density
- Hardness
- Tensile tests

Keywords

Oil Analysis, Sorption Experiments, Mechanical Analysis, Chemical Analysis, Aging processes

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