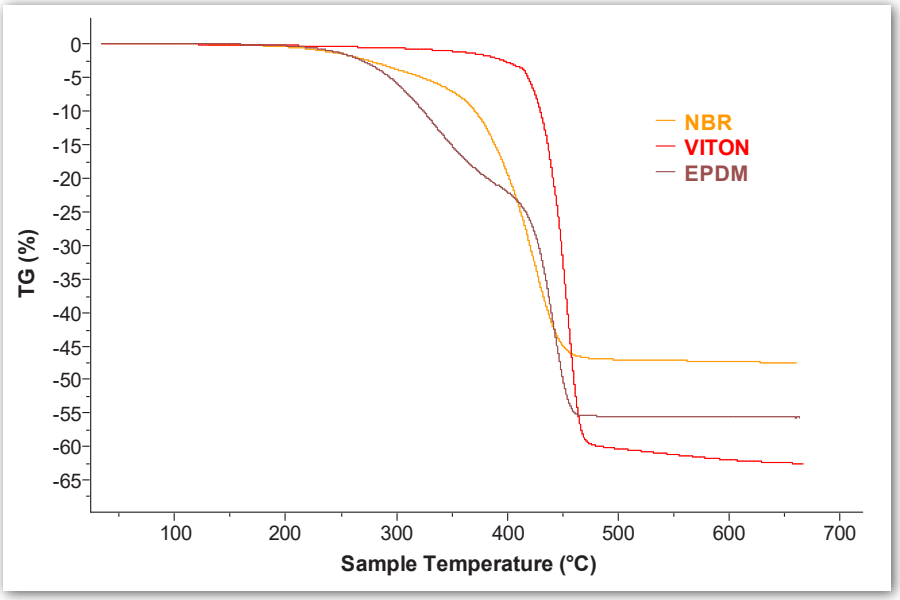
Elastomer o-rings stability by TGA

INTRODUCTION

Many elastomers are used as seals, adhesives and flexible parts. Their resistance to heat, solvents and pressure especially make them excellent candidates to manufacture gaskets and o-rings.

Three different o-rings are investigated by thermogravimetry with the THEMYS ONE TGA to compare their resistance to temperature:
NBR (Nitrile butadiene rubber), **EPDM** (ethylene propylene diene monomer) and **Viton** (fluoropolymer).



EXPERIMENT

THEMYS ONE TGA 1150 was used for the experiments. A sample amount of 30 mg ± 2 mg was weighed and inserted in an alumina crucible.

The following profile was then applied:
- Heating from 30°C to 700°C at 10K/minute
- Atmosphere: nitrogen flow at a rate of 30 ml/min

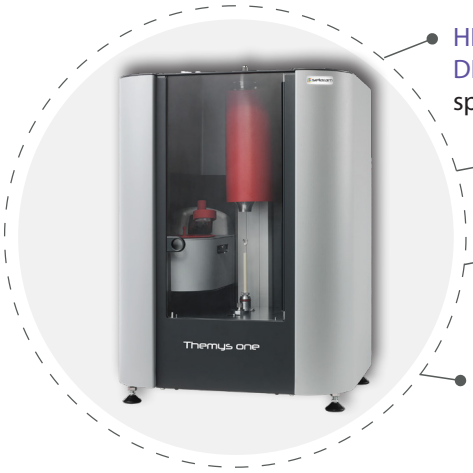
A blank experiment with an empty alumina crucible was run using the same experimental conditions. The obtained signals were used to subtract the contribution of buoyancy effects from the tests with samples.

RESULTS AND CONCLUSION

NBR and EPDM begin to decompose at around 210°C. At 650°C, their respective mass loss is 47.5% and 55.6%. Viton is the most stable, with a decomposition starting at around 370°C. However, it has a higher decomposition rate than the two other elastomers and reaches a mass loss of 61.9% at the end of the ramp.

INSTRUMENT

THEMYS ONE



- HIGH SENSITIVITY BALANCE FOR THE DETECTION OF SMALL MASS VARIATIONS specifically designed for TGA analysis.
- CONVENIENCE OF ONE FURNACE to reach temperatures as high as ***1150°C or 1600°C***.
- PLUG AND PLAY INTERCHANGEABLE RODS to perform TGA only, TG-DSC, TG-DTA, and 3D high sensitivity/Cp measurements.
- EXTERNAL COUPLING CAPABILITY including evolved gas analysers

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