

Graphite content of a reinforced polymer by TGA

INTRODUCTION

Graphite or carbon fibers reinforced polymers strongly improve the physical properties of composite materials like their strength, thickness or thermal expansion. That is why they are used in the aerospace, transportation, sport or chemical industries.

TGA is a quality control / quality assurance tool used to check the graphite or carbon fibers content of reinforced composites. It is a key feature of a composite material as it affects its mechanical and physical properties.

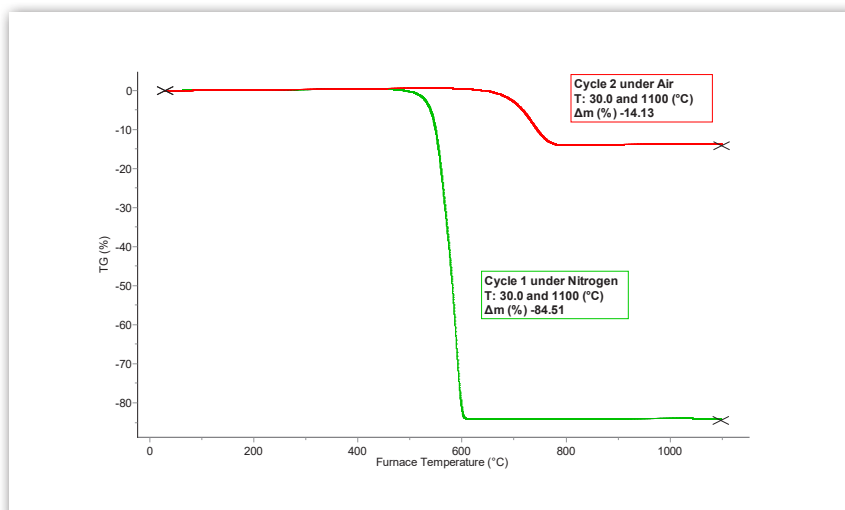
Here, we report the analysis of a graphite-reinforced PTFE (polytetrafluoroethylene) with the SETLINE TGA.

EXPERIMENT

The method consists in applying two heating cycles on the material:

First heating cycle: pyrolysis of the polymer matrix

- First heating cycle (pyrolysis of the polymer matrix) : heating from 30°C up to 1100°C at 10°C/min, under N₂ at 30ml/min
- Second heating cycle (combustion of the graphite or fiber) : heating from 30°C up to 1100°C at 10°C/min, under Air at 30ml/min



Result obtained during the two heating cycles under N₂ and Air

RESULTS AND CONCLUSION

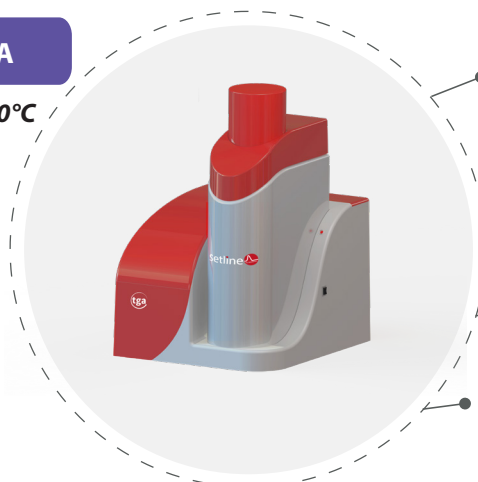
During the first heating cycle under nitrogen, a mass loss of 84.51% can be observed due to the pyrolysis of PTFE. The second heating cycle under air shows a mass loss of 14.13% due to the combustion of the carbon content in the sample.

The pyrolysis of PTFE leads a mass loss near 100% of its initial mass (see ANS020 for more details). It means that the mass loss observed during the second heating cycle is equal to the graphite content in the composite: 14.13%.

INSTRUMENT

SETLINE TGA

Ambient to 1100°C



ACCURACY MADE ACCESSIBLE

with a simple and reliable hang-down balance, specially designed for TGA applications

LOWER COST OF OWNERSHIP

through simplified maintenance and a Replacement Parts Guarantee

TECHNICAL & APPLICATION SUPPORT

for fast expert help with any questions

CALISTO 2.0 EXCLUSIVE SOFTWARE

for intuitive and easy data handling