

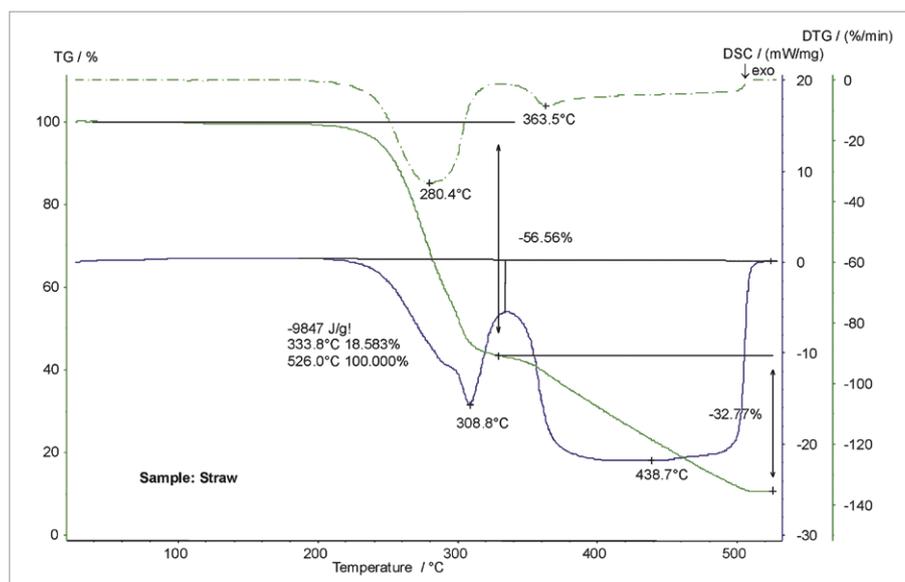
# APPLICATION SHEET

## ORGANICS – RESEARCH & DEVELOPMENT

### BIOMASS

Biomass is an organic, non-fossil material. In other words, biomass describes the mass of all biological organisms, dead or alive, excluding biological mass that has been transformed by geological processes into substances such as coal or petroleum. The entire earth contains about 75 billion tons of biomass. Like coal or petroleum, biomass is a form of stored solar energy. The energy of the sun is captured through the presence of photosynthesis in

growing plants. Biomass is sometimes burned as fuel for cooking to produce electricity and heat. This is called bio-fuel. Like all methods used to generate energy, the combustion of biomass generates polluting as a by-product. Paradoxically, in some industrialized countries like Germany, food is cheaper than fuel compared to the price per joule. Central heating units supplied by food grade wheat or maize are available.



#### Instrument

STA 409 CD – *Skimmer*<sup>®</sup>

#### Test Conditions

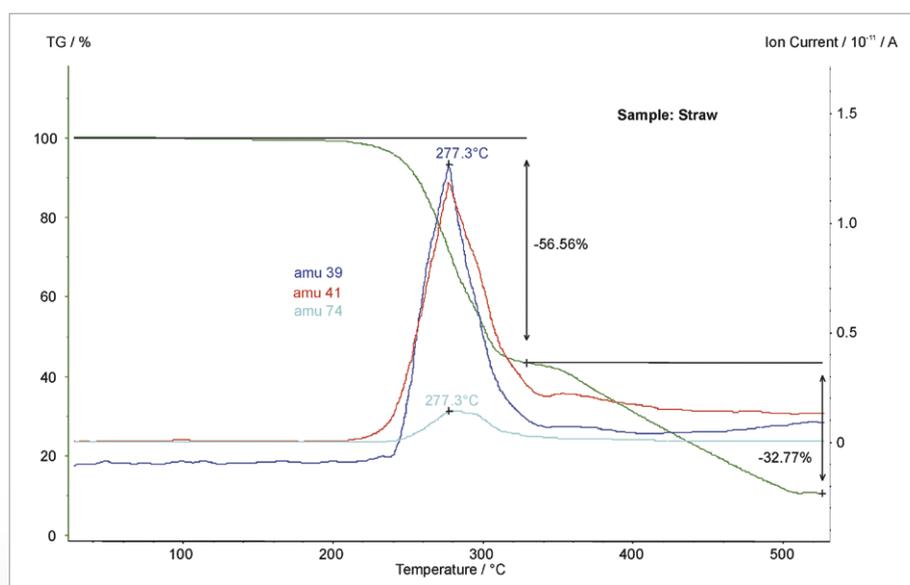
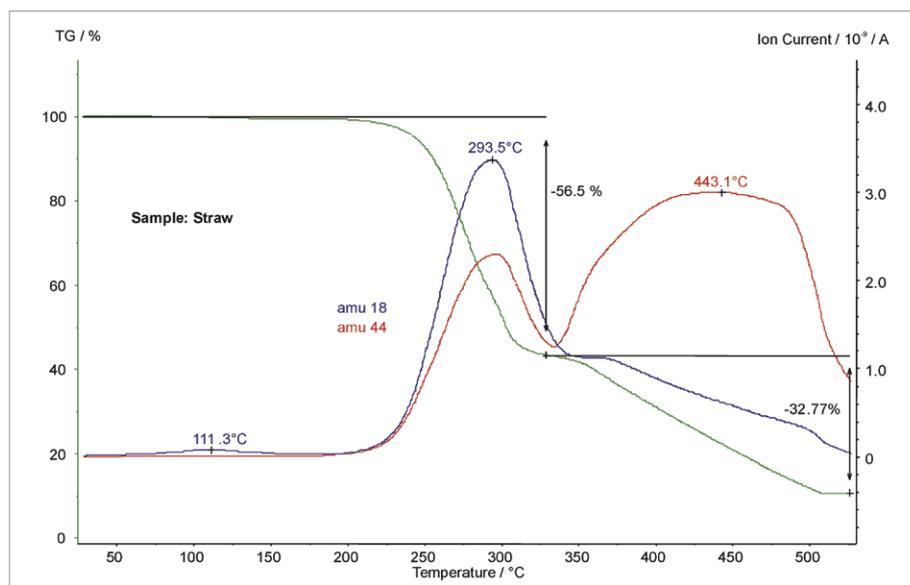
Temperature range	RT... 500°C
Heating/cooling rates	20 K/min
Atmosphere	Ar/20%/O <sub>2</sub> at 75 ml/min
Sample mass	17.26 mg
Crucible	Pt
Sensor	TG-DSC type S

#### Results

The burn-up of straw was studied using simultaneous TG, DSC and MS. During the burn-up which occurred in two steps of 56.6% and 32.8%, an entire energy of 9.85 kJ/g was released as can be seen from the DSC signal. The mass-loss steps are mostly due to the release of CO<sub>2</sub> (mass number 44) and H<sub>2</sub>O (mass number 18) but also salts like KCl (mass number 74) could be detected (see figures below). CO, NO, KOH and Cl<sub>2</sub> were furthermore observed which is not shown here for clarity reasons. The residual mass of 10.6% reflects the amount of ash.

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