Hukseflux
Thermal Sensors

NanoOnSpect project results

Sensors for thermal conductivity and effusivity measurement

Hukseflux regularly participates in collaborative projects funded by the European Union (EU). The NanoOnSpect project "Reliable Integrated Online Characterisation Tool for Thermoplastic Compounds" was finalised in March 2015. Our contribution was the design of a new sensor to measure plastic compound thermal properties. The sensor is integrated in the online viscometer of Gneuss GmbH. A spin-off is the surface mounted NOS03.

Introduction

Hukseflux' main area of expertise is measurement of heat transfer and thermal quantities. We are known as a leading manufacturer of heat flux sensors, radiometers and a range of thermal conductivity measuring systems. We apply our expertise to related fields such as measurement of temperature differences, thermal contact resistance and to flow sensors, fouling sensors and corrosion sensors.
Hukseflux was a project partner in the EU-funded NanoOnSpect project.

The NanoOnSpect project

The project aimed at improving the efficiency and reliability of the production of polymer nanocomposites. Main areas of attention were the dispersion of nanoparticles, measurement and process control. For online measurement, the project partners developed a number of sensors. Process control was improved by sensor signal analysis and by process characterisation.

What we contributed

Adding nanofillers, the thermal conductivity of plastics increases. The thermal conductivity may be used as one of the parameters characterising the process. The challenge was to perform this measurement online, in the melt flow, in a hostile high-temperature and high-pressure environment.
Our activities were:

- design of a sensor and electronics for on-line thermal characterisation
- integration in the Gneuss viscometer
- field testing in "case studies"

The project has successfully resulted in two commercial products: NOS01 and NOS03.

Figure 1 *thermal needle type NOS01; available as a commercial product. NOS01 is inserted in the melt flow*

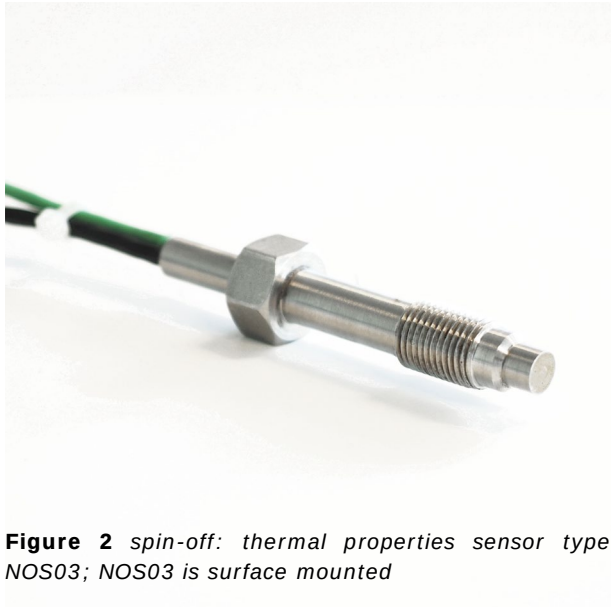

Figure 2 *spin-off: thermal properties sensor type NOS03; NOS03 is surface mounted*

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Result: commercial products

- NOS01 thermal needle suitable for operation in plastic melts is available as option on the Gneuss viscometer
- Spin-off: NOS03, a surface sensor for measurement of thermal conductivity and effusivity, suitable for general application

Figure 3 *spin-off: NOS03 sensor is surface mounted*

References

Sensor characteristics

Table 1 *NOS01 and NOS03 sensors*

SENSORS DEVELOPED IN THE NANO-ON-SPECT PROJECT			
Type	**Model**	**Measurands**	**Rated operating conditions**
thermal needle	NOS01	thermal conductivity temperature	temperature: -50 to + 300 °C thermal conductivity: 0.1 – 6 W/(m·K) inserted in the specimen
surface mounted thermal properties sensor	NOS03	thermal conductivity thermal effusivity temperature	temperature: -50 to + 300 °C thermal conductivity: 0.1 – 50 W/(m·K) surface mounted on the specimen

About Hukseflux

Hukseflux Thermal Sensors offers measurement solutions for the most challenging applications. We design and supply sensors as well as test & measuring systems, and offer related services such as engineering and consultancy. With our laboratory facilities, we provide testing services including material characterisation and calibration. Our main area of expertise is measurement of heat transfer and thermal quantities such as solar radiation, heat flux and thermal conductivity. Hukseflux is ISO 9001:2008 certified. Hukseflux sensors, systems and services are offered worldwide via our office in Delft, the Netherlands and local distributors.

Contact Hukseflux

We offer creative solutions as well as highest quality products at an acceptable price level. If we cannot offer you an acceptable solution ourselves, we will tell you who can. Please contact us to discuss if our engineering and consultancy services can offer a solution for your needs.

Challenging heat transfer or
thermal measurement problem?
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