

PRESS RELEASE

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The Fraunhofer IST at the Hanover Fair

Optimum temperatures in plastic injection molding by means of thin-film sensor technology from the Fraunhofer IST

The precise regulation of mold temperatures and flow rates in injection molding is a major prerequisite for the resource-efficient, economical and reliable production of high-quality plastic parts. In order to optimize the design and monitoring of mold temperature control, the real temperatures, pressures and flow rates must be continuously recorded during the injection-molding process. For this purpose, a sensor system is being developed at the Fraunhofer Institute for Surface Engineering and Thin Films IST with which, for the first time, the temperature can be measured directly inside the three-dimensional temperature-control channels.

In order to achieve this, the scientists constructed a special sensor insert that can be integrated into a 6-circuit multi-coupling. A multi-sensory layer system was deposited on this exchangeable module, extending into the inner areas, and the conductive paths were structured across the rounded area. The thin-film system consists of a piezoresistive and wear-resistant DiaForce® layer on which individual electrode structures made of chromium are deposited. This is followed by two electrical insulation layers composed of aluminum oxide or SICON®, between which both the conductive paths from the electrodes and a chromium temperature sensor are created. The layer system is characterized by its resistance to the employed media.

The sensor insert can already be used to measure pressure and temperature in contact with water flowing over it. "Prospectively, an extended measuring system for the combined detection of temperature, pressure and flow rate is to be developed. Such multi-sensory thin-film systems have a high innovation potential and offer far-reaching possibilities in the field of in-situ monitoring in cyber-physical production systems," explained Anna Schott, Head of the "Micro and Sensor Technology" group at the Fraunhofer IST.

At the Hannover Messe from 30th May to 2nd June 2022, the Fraunhofer IST, as part of the Fraunhofer business unit Adaptronics, will be presenting, amongst other items, a demonstrator of a sensory multi-coupling for temperature control in plastic injection molding. This can be found at the central joint stand of the Fraunhofer-Gesellschaft (Hall 5, Stand A06).

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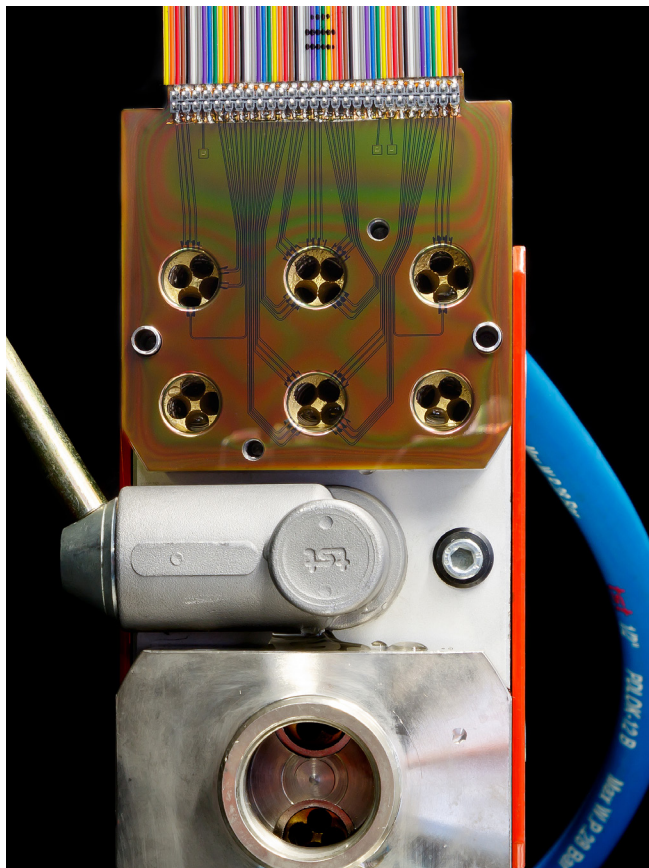
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About the project

The results described were achieved within the ZIM cooperation project “Temperature-control coupling with integrated networked sensor technology” (TivSee) in collaboration with the companies Nonnenmann GmbH and eck*cellent IT GmbH. The project was funded by the Central Innovation Program for SMEs (ZIM) of the German Federal Ministry for Economic Affairs and Climate Action (BMWK) based on a resolution of the German Bundestag and the German Federation of Industrial Research Associations (AiF).

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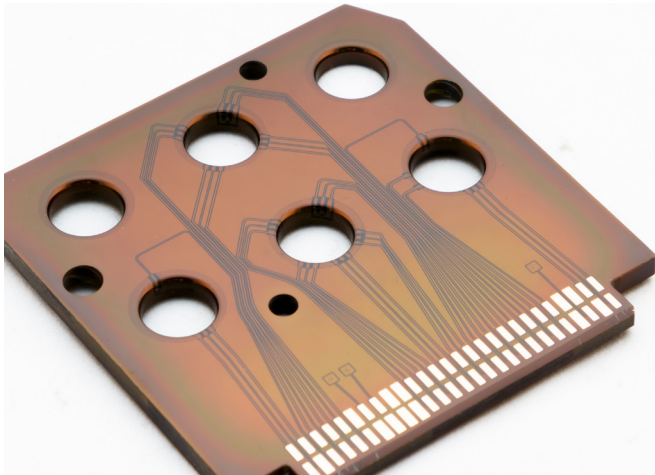
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Sensory insert for a multi coupling for the monitoring of the temperature control.

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FRAUNHOFER INSTITUTE FOR SURFACE ENGINEERING AND THIN FILMS IST



**Metal base body coated with
the multi sensory layer system.**
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