Ticona
ENGINEERING POLYMERS

April 05 2004

Microfluidics Made Easy with Hi-Tech COC Polymer from Ticona.

Topas® COC, the Preferred Polymer for Microfluidic Device Specialist thinXXS.

Microfluidic components are critical elements in the development of a wide variety of modern systems and device solutions. Sectors in which they are most widely used include drug discovery, diagnostics, analytics, biosensors, and environmental monitoring. Individual applications may range from laboratory analyses on the surface of a slide to the construction of micro pumps required for the transportation of minute quantities of liquids. Common to all applications is the need for a material with optimal properties, while also being cost-efficient to manufacture. Topas® cyclic olefin copolymer (COC), a versatile high-performance thermoplastic from Ticona, scores well on both counts, making it the material of choice for thinXXS GmbH (Zweibrücken and Mainz, Germany), a supplier of micro-structured components and systems specializing in the production of microfluidic applications.

The most recent example of an innovative thinXXS product development is a microfluidics "construction-kit" containing several micro-structured components with channels, mixers, reaction chambers, and rectification columns. Flexible design facilitates seamless combination of individual components and, thanks to defined interfaces, the assembly of application-specific systems for use in biotechnology or medicine.

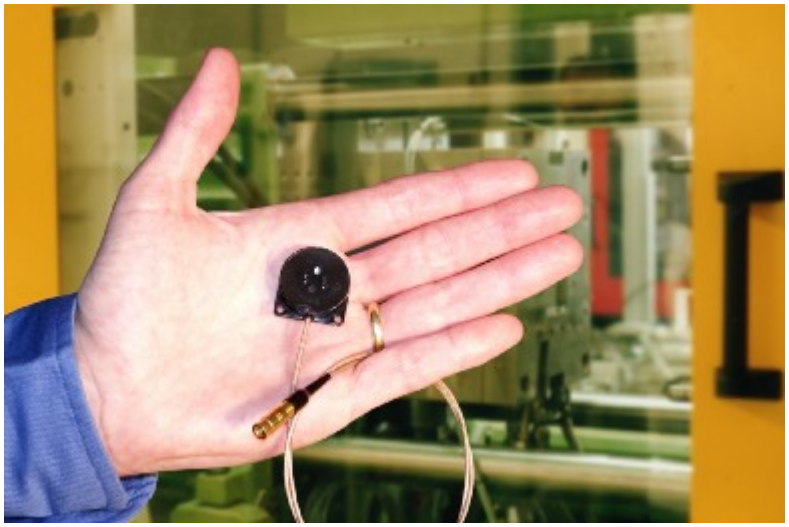
The aim of the module is to minimize the financial and technological risk involved in the development of a so-called "lab-on-a-chip." Once the desired functional principle has been confirmed, the module can be integrated onto a plastic chip. For the engineers and technicians at thinXXS, manufacturing the components using Ticona's Topas® COC proved to be the ultimate win-win option.

"A polymer suitable for microfluidic chips has to satisfy a whole host of different criteria," stresses Dr. Hans-Joachim Hartmann, one of two thinXXS GmbH chief executives. "The particular strength of Topas® COC is the fact that it boasts just the right combination of properties," Hartmann adds.

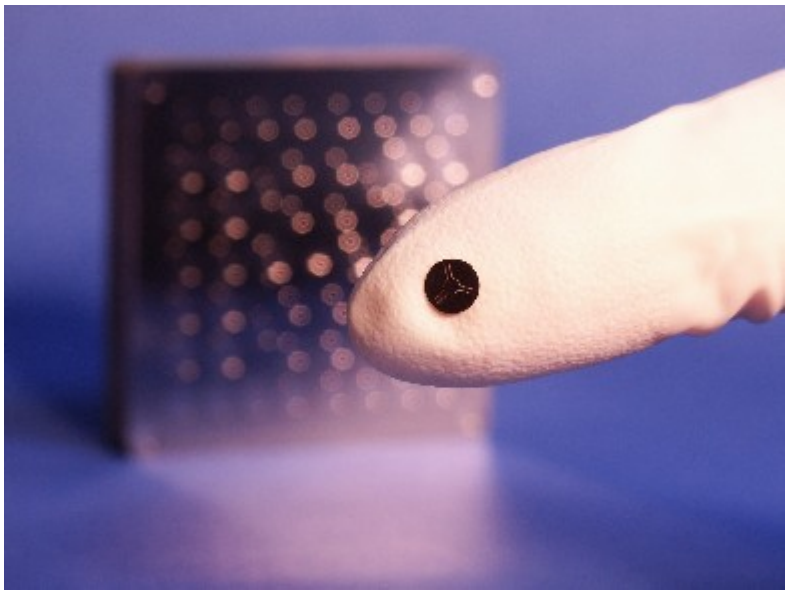
The incredible lightness of modern micro pumps

thinXXS also opted for Topas® COC in its XXS2000 micro pump. No bigger than a one-Euro coin (about 22 mm diameter), the piezo-driven diaphragm pump is used to transport the tiniest volumes of liquid or gas in diagnostics, environmental analytics, or fuel cells for mobile applications. The good chemical resistance of Topas® COC ensures that damage to the pump is ruled out even in the case of more aggressive media. All plastic components in the pump, which weighs just three grams, are made of the high-tech polymer from Ticona.

(Click a photo to download it.)



Caption: *Manufactured from Topas® COC, piezo-driven micro diaphragm pumps produced by thinXXS GmbH (Germany) are used to distribute the tiniest amounts of liquid or gas.*

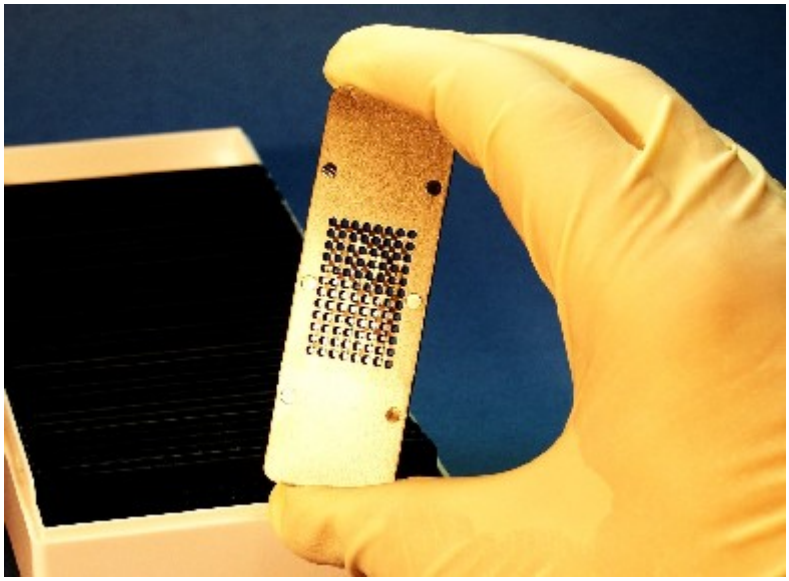


Caption: *A spring the breadth of a single human hair, such as this one made from Topas® COC, has to be able to open and close a micro pump valve over 100 million times.*

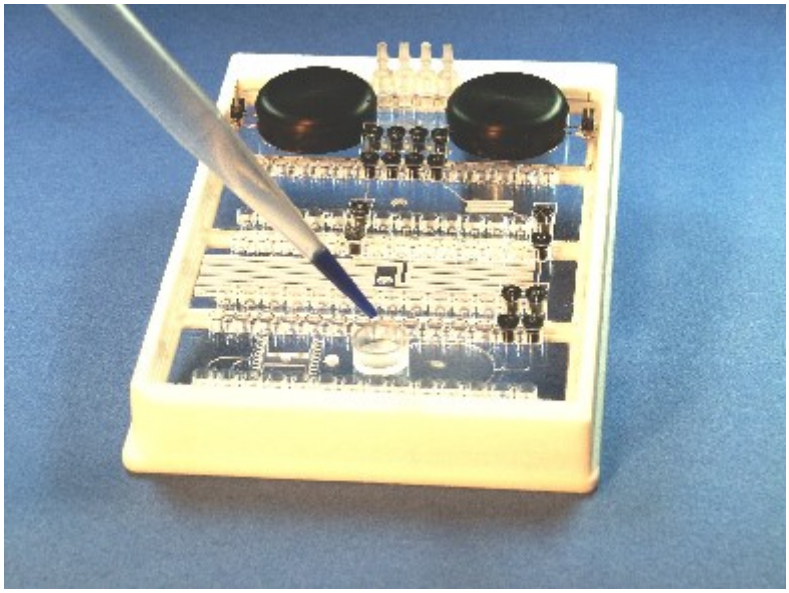
Among other excellent properties of Topas® COC are good weldability and sterilizability, the appropriate elasticity module, and the ease with which a homogeneous coating (for hydrophilization and hydrophobization) can be applied. No less compelling is the fact that the material also has the necessary approvals for medical applications.

Microplate slides: Optical features are key

Chemical resistance and - more importantly - its very good optical properties are finally the factors that tipped the scales in favor of Topas® COC in the production of microplate slides. The material's extremely low level of inherent fluorescence is crucial, ensuring that the new-style thinXXS slides with their 96 wells are able to meet the exacting demands of fluorescence microscopy. The slides are particularly well suited for the examination of low-volume samples of approximately one microliter. Special color-coded versions and a model facilitating the rapid cooling of samples make the microplate slides ideal for the most diverse of applications in both biotechnology and medicine.



Caption: *Microscope slides from thinXXS GmbH (Germany), model MTS96, are made from Topas® COC with 96 wells set at the same pitch as those on a 1536 microplate.*



Caption: *This microfluidics "construction kit" enables Topas® COC slides with the most diverse of functionalities to be combined in a microplate frame to perform complex laboratory processes.*

(Click a photo to download it.)

About Topas® COC

Topas® COC (cyclic olefin copolymer) is an amorphous engineering plastic which, in addition to strength, stiffness, heat resistance and excellent dimensional stability, has high clarity, transparency, and low moisture absorption. Approved for food-contact applications in Europe and the USA, its various grades are used in pharmaceutical blister packaging, injection-molded precision optics, medical and laboratory containers, and toner binder resins for color laser printers.

About thinXXS

thinXXS GmbH (Germany) produces and develops microfluidic and microoptic components and systems manufactured from plastic materials. The company has more than 30 employees at its two facilities in Zweibrücken (production) and Mainz (sales and development). The range of products includes a number of microfluidic systems, their adaptation or integration into OEM products, as well as the development and manufacture of products to client specifications. The markets benefiting from these hi-tech solutions include life sciences, medical technology, and

*automation. Further information is available at **http://www.thinxxs.com**.*

About Ticona and Celanese

Ticona, the technical polymers business of Celanese AG, Kronberg, Germany, produces and markets a broad range of engineering polymers and achieved sales of € 675 million in 2003. Ticona has approximately 2,000 employees at production, compounding and research facilities in the USA, Germany and Brazil.

Celanese AG is a global chemicals company with leading positions in its key products and world class process technology. The Celanese portfolio consists of four main businesses: Chemical Products, Acetate Products, Technical Polymers Ticona, and Performance Products. The Performance Products business consists of Nutrinova sweeteners and food ingredients. Celanese generated sales of around € 4.1 billion in 2003 and has about 9,500 employees. The company has 24 production plants and six research centers in 10 countries mainly in North America, Europe and Asia. Celanese AG shares are listed on the Frankfurt stock exchange

 ck Exchange (symbol CZ).

*For further information about Ticona and Celanese, please visit our websites: **http://www.ticona.com** and **http://www.celanese.com**.*

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