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Selective plasma treatment - enabling technology for Microstructring of MEMS and other related devices

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MEMS devices can nowadays be found almost everywhere. Only a few examples are automobiles, the growing market of consumer electronics as well as microfluidic devices for BioMEMS and medical applications. As for the next few years the largest growth within MEMS is forecasted for microfluidic devices several companies focus in this field where liquids need to be handled and treated in a microsystem.
Wafer processing contributes a big portion of the overall device costs and is a relevant cost portion of the whole manufacturing process. Therefore MEMS manufacturers try to streamline their processes by reducing process steps and at the same time grow the complexity of the manufactured devices. Today typical microfluidic devices for chemical and biochemical applications often require special surface treatment or the implementation of catalysts. With a new equipment setup and technology for selective plasma activation developed by SUSS MicroTec and Fraunhofer IST it is possible to replace or even reduce commonly used process steps and therefore simplify the standard manufacturing of MEMS devices. Recently such a Y- shaped microseparator was built at mikroglas chemtech GmbH using selective plasma treatment to change the surface properties in one of the channels of the device. Even closed microchannels can be treated which can for example avoid contamination and which further simplifies the process steps. The selective plasma treatment is based on a dielectric barrier discharge in atmospheric pressure. The setup is implemented into a standard mask and bond aligner so that the exact alignment of electrode and wafer will be ensured and an exact gap setting can be used.
The selective treatment can be either done on structured wafers where the top or bottom surface will be treated by controlling the gap or it can be done by a structured electrode on a plane or structured wafer.

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