

Micro-channel Device Manufacturing Technology

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- ⇒ Design and processing technology for packaging, one of the core technologies for manufacturing of plastic microchannel device using microchannel with a size ranging from dozen nanos to several hundred micros, that seals microchannel to prevent leaking of liquid sample and minimizes deformation of the channel.
- ⇒ Irreversible packaging technology including plastic plate welding and adhesion and reversible packaging technology allowing sealing and unsealing repeatedly.

Client / Market

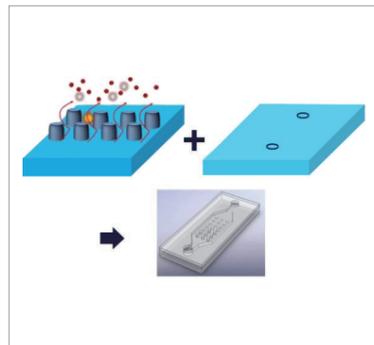
- Diagnostic device, medical device companies

Necessity of this Technology

- Conventional adhesion or welding packaging technology for plastic material has difficulty in sealing and maintaining precisely nano/microchannels on the surface due to heat, pressure, or chemical solvent used during the process that affect the surface structures and properties.
- Due to the high temperature and chemicals during the packaging process that may cause damage in various biochemical substance including protein, it can be used only for very limited applications.
- When irreversible packaging is done with adhesion and welding, unsealing and resealing is difficult in the middle of using the microchannel device or pre/post-process for using the device when it is needed.
- Packaging done with mechanical clamping, the microchannels are hard to be sealed uniformly, which results in leakage from some of channels frequently.
- It is necessary to apply the optimal packaging design and process technology that considers the shape and size of the microchannel depending on the purpose, requirement, and use environment of the microchannel.

Technical Differentiation

- Capable of various irreversible packaging process technologies such as ultrasonic welding, thermal or adhesive bonding that prevents leaking and minimizes deformation of the microchannel on a plastic plate.
- Capable of reversible packaging process technology, heating-free and chemical-free, that can seal the microchannel hermetically and maintain the microchannel shape and size precisely.



DESIRED PARTNERSHIP

Technology Transfer



Licensing



Joint Research



Other



TECHNOLOGY READINESS LEVEL [TRL]

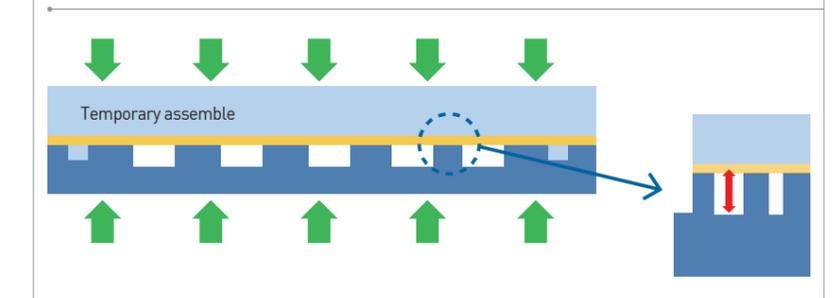
Research, basic explanation | Project concept or idea development | Technology idea verification | Prototype development | Trial product production/evaluation in similar environment | Pilot field demonstration | Development and optimization of commercial model | Commercial product demonstration | Mass production and initial market launch

- With the reversible packaging process technology, the device can be unsealed or resealed repeatedly while the device is in use or in pre- or post-process, which makes the device be applied to more diversely.

Excellence of Technology

- Reversible packaging technology, prevents negative effect on biochemical substances like protein and cell due to its heating-free and chemical solvent-free process, which is a great benefit regarding development of bio devices.
- As a mass producible packaging technology using plastic material, productivity that is equivalent to that of injection molding can be realized-over 90% yield and processing time of 1 minute or less.
- Based on this reversible packaging technology, the lead time for a device can be reduced to from few days to a month, which enables rapid development.

Reversible, Unsealable and Resealable, Packaging Structure



Current Intellectual Property Right Status

PATENT

- Fabrication of Plastic Bio-chip Employing Microchannels (KR1392426, PCT/KR2014/005141)
- Local Pressurization Typed Microchannel (KR2017-0184209)
- Microchannel with Joints (KR2017-0184201)
- Microchannel (KR2016-0079890)

KNOW-HOW

- Microchannel ultrasonic welding process
- Microchannel film adhesion packaging process
- Thermal and chemical welding for microchannel