

# Injection Molding Technology for Plastic Product with Surface Nano/Micro-structures

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- ⇒ Mold and process technology for injection molding to produce plastic products with surface nano/micro-structures ranging from dozen nanometers to several hundred micrometers
- ⇒ Rapid heating/cooling mold and process technology to injection mold precisely nano/microstructures existing on surface of plastic products including demolding of the injection molded surface structures.

### Client / Market

- Diagnostic device, medical device company, electrical electronics and home appliances, automobile and automobile parts, plastic exterior products

### Necessity of this Technology

- Nano micro structures are manufactured mainly by etching process for silicon and glass substrate, hot embossing or PDMS casting as a replication process, but injection molding process is required for large scale manufacturing of plastic products with nano/micro surface structures
- During the injection molding of plastic products, plastic melt injected into the mold cavity is solidified quickly from the surface to cause incomplete replication of the nano/micro structure on the surface. Another issue is the deformation of the injection molded surface structures in demolding step due to interference with the mold surface. These incomplete replication and deformation of the nano/micro surface structures are main drawbacks for practical use.
- For mass production of plastic products with nano/microstructures, advanced mold and process technology for injection molding is a key to mold nano/micro-structures precisely while maintaining the productivity and cost competitiveness of conventional injection molding.

### Technical Differentiation

- Equipped for mold technology using metal stamper with surface nano/micro-structures fabricated by lithography and electro-plating process, enabling quick development of products employing nano/microstructure.
- Injection molding of High aspect ratio nano/microstructures based on rapid heating/cooling technology for the mold using stamper
- Design of applications employing Nano/microstructure and manufacturing of prototype based on mass production process

## DESIRED PARTNERSHIP

Technology Transfer

Licensing

Joint Research

Other



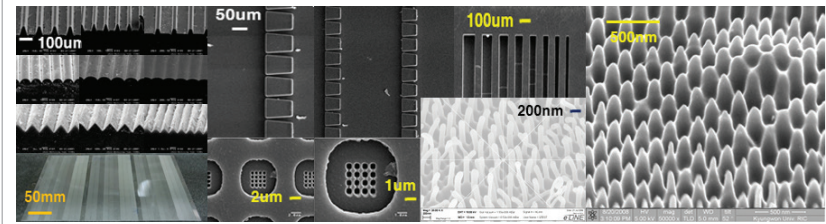
## TECHNOLOGY READINESS LEVEL [TRL]



### Excellence of Technology

- Manufacturing of plastic products employing surface nano/micro-structures with the productivity equivalent to that conventional injection molding process (cycle time <1 minute)
- Equipped for injection molding technology in large scale of production for plastic plates with surface nano/micro-structure such as micro-channel.
- Injection molding technology for High aspect ratio nano-structure

Nano/Micro-structure Manufactured by Injection Molding using Plastic Material



### Current Intellectual Property Right Status

#### PATENT

- Mold for Molding Nano/Micro Surface Structure (KR0768329)

#### KNOW-HOW

- Mold structure for injection molding using a stamper with surface Nano/micro-structure
- Rapid heating/cooling mold and process technology
- Optimization of injection molding technology for plastic plate with surface nano/micro-structure
- Demolding technology of article with surface Nano/micro-structure during the injection molding