

# Metal Injection Molding Technical Newsletter

World's Finest MIM Technology from Japan "μ-MIM®"

Volume 16

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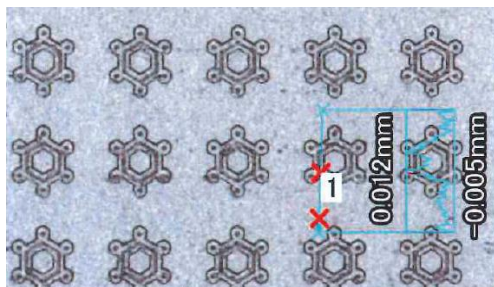
## 1. New Technology realised by μ-MIM

Cost-down was realised in small, fine and high-precision process

Question "how much is the accuracy of μ-MIM®?" is answered here. Accuracy of MIM parts depend on the accuracy of mould and control technology of shape deformation during the sintering process.

Below is an enlarged image of sinter parts made by MIM imitating snow crystals in the same size range 10μm pattern as the actual snow crystal. This is one of examples of microfabrication technology applying our possessed technologies such as manufacturing of MIM materials, sintering not only the mould design.

Please contact us for the mass production, miniaturization or integration of micro parts.



MIM parts image of 10μm snow crystal pattern

## 2. New development of nanoscale porous metal

Specific surface of 100 m<sup>2</sup>/g was realised

High specific surface area can be raised as one of the feature of porous metal. The specific surface area is an essential value for the design, for example if it is used for electrode or cooling parts since the specific surface area per unit volume affects the performance. We have researched jointly with AIMR, and established mass production process of bimodal porous metals having porous structure of micrometre and nanometre order porous.

The specific surface area of this bimodal porous metal reaches to approximately 100 square metre per gram.

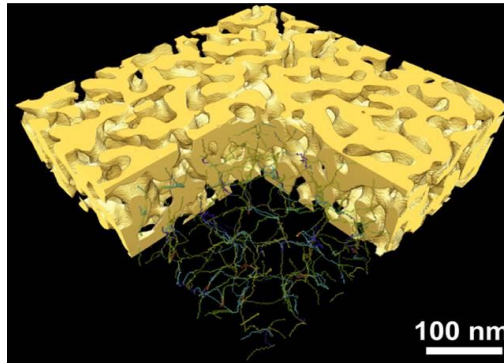


Image of bimodal porous metal having specific surface area of 100 m<sup>2</sup>/g

## 3. The surface roughness of Ra - 1μm has been realised

"Surface roughness" is one of the frequently asked questions.

MIM is a technology derived from the powder metallurgy. Therefore, many people consider stain or matte finish is the standard finish of MIM product surface. We would like to introduce the surface roughness realised by μ-MIM® of Taisei Kogyo.

Both of the powder compacted moulded products and MIM use the fine metal powder. MIM uses the metal powder of several dozen μm or several μm in particle diameter although in powder compacted moulded products use hundreds μm.

It is a fate of powder metallurgy that the surface roughness is influenced by the applied particle diameter, thus, MIM using fine metal powder realises the smoother surface roughness comparing with powder compacted moulded products.

Further, the difference of particle diameter of these metal powders influences the density of metal products.

In the powder compacted moulded product, pours are remaining 5 -30% of volume. On the other hand, in MIM product, it is remaining 2-3 %, therefore MIM product realises the same level of mechanical property as machined products.

The MIM products if we use smaller or finer metal powder, smoother surface will be realised logically. However, composing the feedstock, injection moulding and sintering deformation control will be more difficult actually if the metal powder diameter is smaller.

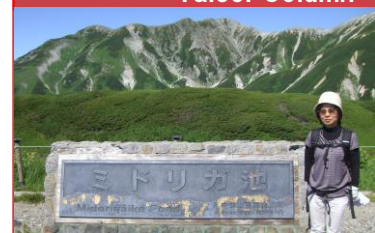
We have realised the mass production using the single-μm or sub-μm metal powder with our unique μ-MIM technology developed by us. Please contact us if you are looking for the MIM products of a smoother surface roughness.

Surface roughness to be realised by μ-MIM

Ra - 1μm

Rz - 7μm

### Taisei Column



Production control Dept: Ms.Chisako Taniguchi

Hello. My name is Chisako Taniguchi. I am mainly in charge of production control. I have been working at Taisei Kogyo for a long time, and always enjoy trips on holidays. Only 3 prefectures in Tohoku region are left to visit among the 47 prefectures. I would like to visit there within few years. The photograph is of Midoriga-ike, Toyama prefecture which is very transparent and beautiful. Please visit there. It is guaranteed to be impressive!