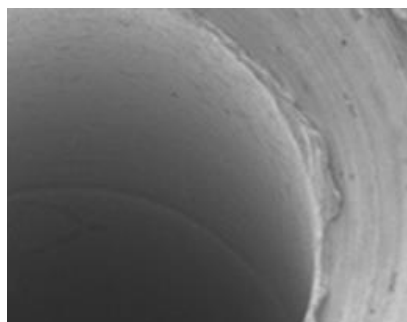
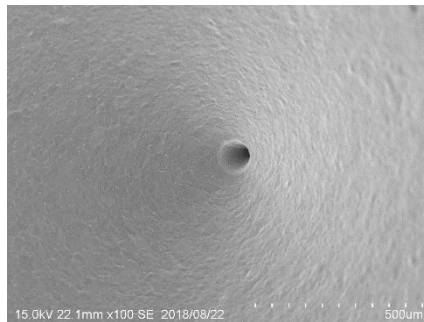


-Success in micro nozzle mass production made of difficult-to-machine material -

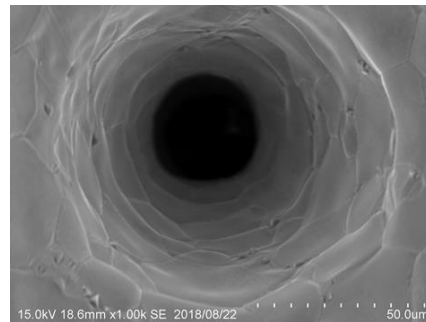
In general, high dimensional accuracy of taper, curve design and smooth surface are required in small nozzles, especially the ones used in gasoline or diesel engines. Those nozzles directly inject fuel into the cylinder thus, the spray characteristics affect the fuel consumption or other performance directly. The optimum flow path design obtained from numerical calculations or other simulation is generally introduced, however, it is very difficult to realise the design in mass production. Moreover, if the nozzle diameter is less than 1 mm it is difficult to mass produce even the simple straight hollow design due to the very short cutting tool lifetime.



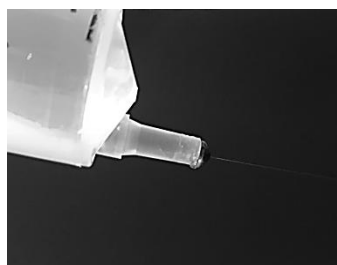
- Machine part with burr -



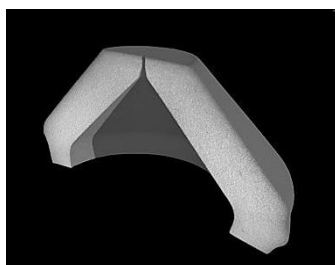
- MIM part without burr -



- Realising the world's first 0.03 mm hole nozzle 17-4PH in MIM industry -

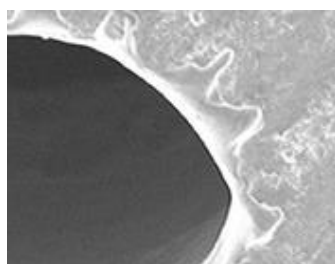


- State of water spray -

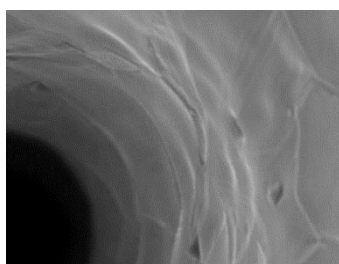


- Cross-sectional image by X-CT -

We have realised mass production of micro nozzle, ϕ 0.03 mm with an aspect ratio of 5. 0.03 mm is actually smaller than a standard hair diameter. It is said ϕ 0.05 mm is the smallest limit by machining at this moment. Our moulding and sintering technology using super fine metal powder, which cultivated as μ -MIM technology, realises dense smooth surface, the roughness of $R_a = 0.3$ without post-processing. In microfabrication like this nozzle, it is difficult to achieve this surface quality even with the latest laser processing technology due to the problem of dross deposits or residual thermal stress and so on. When you consider serial production of ultra small nozzle with complicated flow path design, please consult to Micro MIM Japan Holdings Inc.



- Dross trace in laser processing -



- MIM sintered part -

Exhibition : Medical Fair Asia 2018, Singapore

Good day. I am Makiko, responsible R&D in Thailand. We have exhibited Medical Fair Asia 2018 in Marina Bay Sands, Singapore, 28 -31 Aug as Micro MIM Japan Holdings Inc. together with a partner company; Sayama Mold Manufacturing Co., Ltd., WORKS Co., Ltd. and Sanwa Plastic Industry Pte. Ltd. There were many visitors in our booth and most of them were surprised our ultra-small Micro MIM technology samples. We had very good responses and spend beneficial time there as we hardly had to explain basic overview of MIM.



Column