

July 1, 2022

JX Nippon Mining & Metals Corporation

Investment in NanoWired GmbH

JX Nippon Mining & Metals Corporation (President: Murayama Seiichi; “the Company”) has decided to take a capital stake in the German start-up NanoWired GmbH (CEO: Olav Birlem; “NanoWired”).

Based in Germany, a global center of metal-related industries where cutting-edge research in fields such as IoT and AI is flourishing, NanoWired develops technologies for growing fine wire less than 1um diameter(“NanoWires”) on various substrates and production equipment for such NanoWires. Compared to conventional bonding techniques that use solder or similar fusible alloys, growing NanoWires on substrates enables bonding at room temperature or lower heat and higher density in shorter time, making it possible to achieve high electrical and thermal conductivity and bonding strength.

Demand for miniaturization and higher performance of electronic devices has accelerated in conjunction with the recent expansion of the IoT society, presenting challenges for dealing with heat generated due to higher-density electronic devices and improving product reliability. In response to these challenges, NanoWired is contributing to the realization of innovative electronic devices by proactively developing electrical and thermal interface materials* that utilize NanoWire technology, as well as semiconductor mounting technologies.

The JX Nippon Mining & Metals Group Long-Term Vision 2040 sets direction for engaging in co-creative development with partners to constantly create new technology-based business, and as part of these efforts the Company is advancing collaboration with start-ups. Through such co-creation, the Company will strengthen its relationship with NanoWired and undertake various forms of collaboration. Examples for consideration include providing materials required for NanoWire growing processes, such as copper foil and plating materials; joint development focused on future social trends, including those in the semiconductor mounting field, where growth is expected to accelerate; and application of NanoWire technologies to the Company’s products.

The Company will proactively strive to develop new products together with its partners, and by proposing and supplying cutting-edge materials essential to innovative electronic devices, will contribute to realizing a sustainable society.

*Materials that can efficiently radiate heat by bridging gaps between components and reducing thermal contact resistance.

◆ NanoWired Overview (as of June 2022)

Company name	NanoWired GmbH
Established	2017
Location	Gernsheim, Germany
Representative	Olav Birlem (CEO)
Business activities	Development of NanoWire growing technologies and production equipment

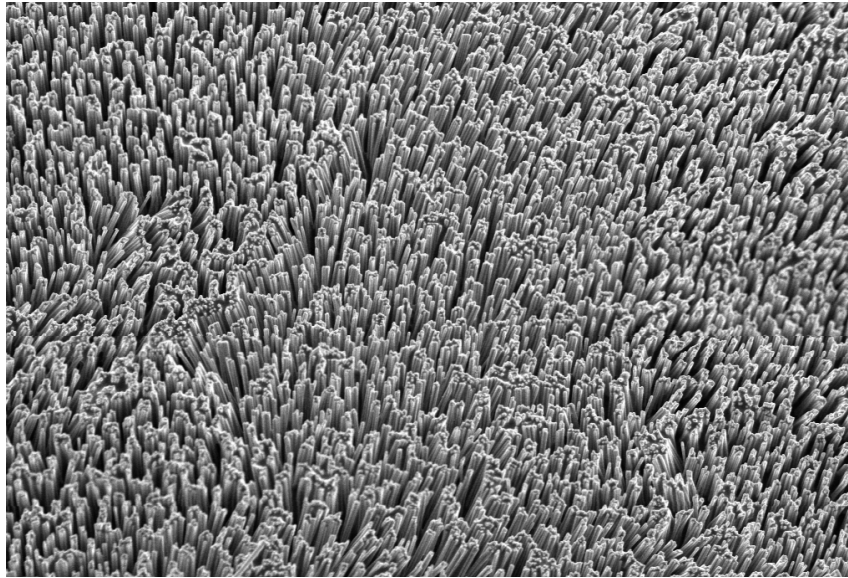


Figure 1: Nanowires formed on metal surface

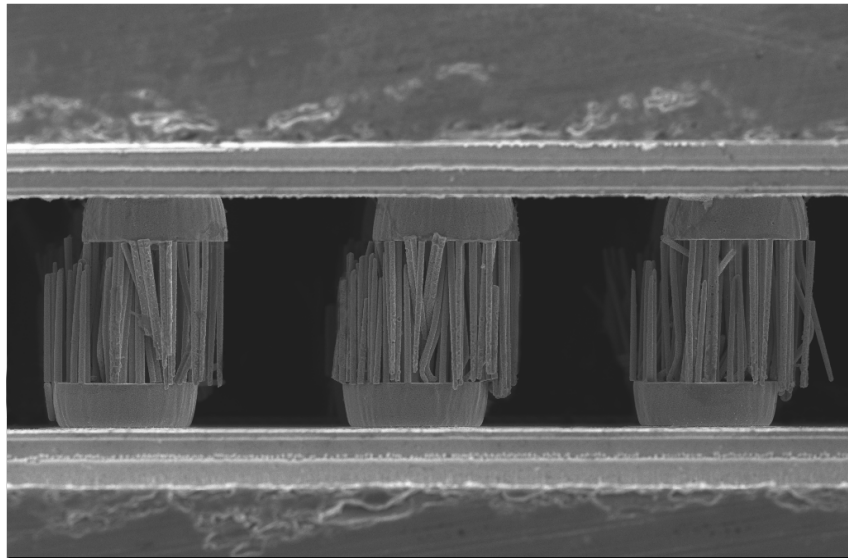


Figure 2: Bond between substrates using nanowires (example)

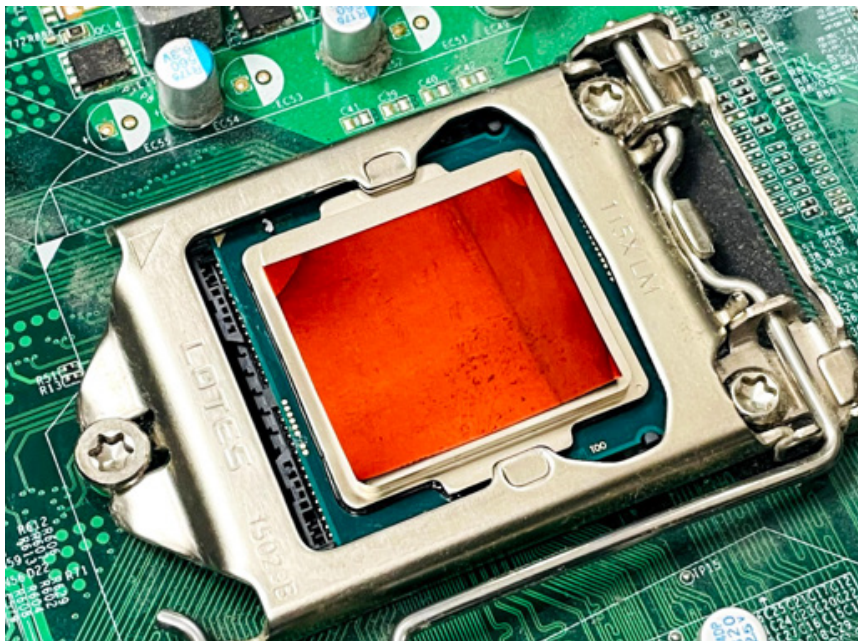


Figure 3: Example of nanowire utilization in semiconductor mounting field (orange portion in center of image)