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Canadian Nano-player competes with global leaders in semi materials market

By: *By Robert Lyn, chief technology officer, Microbonds Inc.*

Relatively unknown in Canada, Markham ON-based [Microbonds Inc \(http://www.microbonds.com\)](http://www.microbonds.com), has made a name for itself and its technology outside of Canada, within the fiercely competitive market of microelectronics chip assembly. While many people are familiar with silicon chips and transistors made famous by companies like Intel and IBM, what is not commonly understood is how the information inside those chips makes its way to the end-user. For over 90% of all chips produced, the first step along this path is a connection to an ultra-thin metallic wire, less than half the diameter of a human hair, which is welded on a high speed automated machine akin to high tech sewing machine, using a process called wire bonding.

For more than 50-years, the metallic wires used have been bare or un-insulated conductive copper, gold or aluminum metal, which means that the wires cannot be placed in close proximity or they will touch and create an electrical short circuit. This limitation restricts how many electrical pathways can be used to carry information in and out of the chips, representing a serious limitation as more transistors are being packed into the chips following Moore's Law. To use a simple analogy, it is similar to a city constructing more buildings in the downtown core, without the ability to provide an adequate amount of roads and highways. The result is traffic congestion and inability to fully utilize the available resources.

This is where Microbonds' trade-marked X-Wire technology comes in. Using advanced thin film materials and nano-scale coating technology, Microbonds is able to precisely coat an ultra-thin insulation film onto the metallic wires, with a tolerance of less than 10 nanometers. The resulting insulated wire enables a higher density packing of bonding wires, removing the limitations due to wire shorting and opening up the possibility of new chip designs.

"Using nano-scale coating technology, Microbonds coats an ultra-thin insulation film onto the metallic wires"

However, before the industry was willing to adopt, Microbonds' coated technology had to be tested and verified to be reliable. Over a significant period, a long list of industry leading semiconductor companies subjected X-Wire to stringent reliability testing. Ultimately, it was deemed worthy. Then, earlier this year, a milestone was announced together with [Tanaka Denshi Kogyo \(http://www.tanaka.co.jp\)](http://www.tanaka.co.jp) (Japan) and [UTAC \(http://www.utacgroup.com/index.html\)](http://www.utacgroup.com/index.html) (Singapore), which heralded the production readiness of Microbonds' X-Wire technology.

UTAC is a leading supplier of assembly services for semiconductor chips, while Tanaka Denshi Kogyo is a Japanese advanced materials giant and the top supplier in the industry. Tanaka, together with a long list of suppliers and semiconductor companies, including Intel and Motorola, had previously attempted insulated bonding wire solutions without success. With Microbonds X-Wire technology proving to be the only viable solution to this long sought after goal, Tanaka licensed the X-Wire technology from Microbonds and has spent the last few years refining the process for high volume manufacturing. The good news is Microbonds Inc. continues to prove that Canadian technology companies can compete against the best in the world with perseverance and ingenuity.