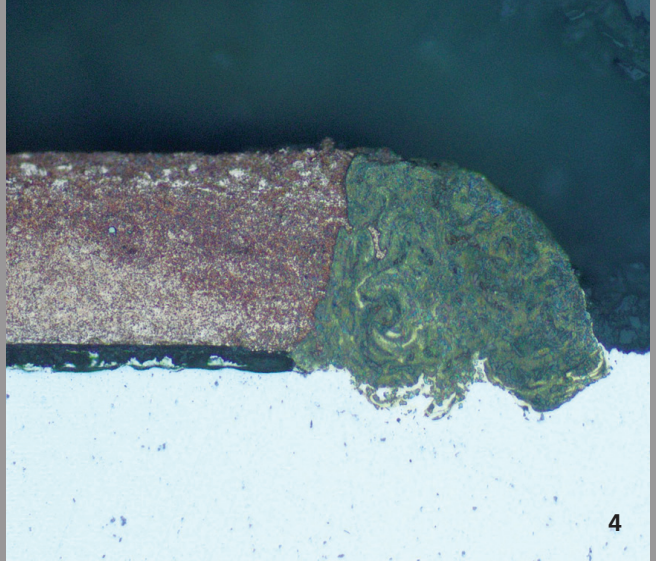

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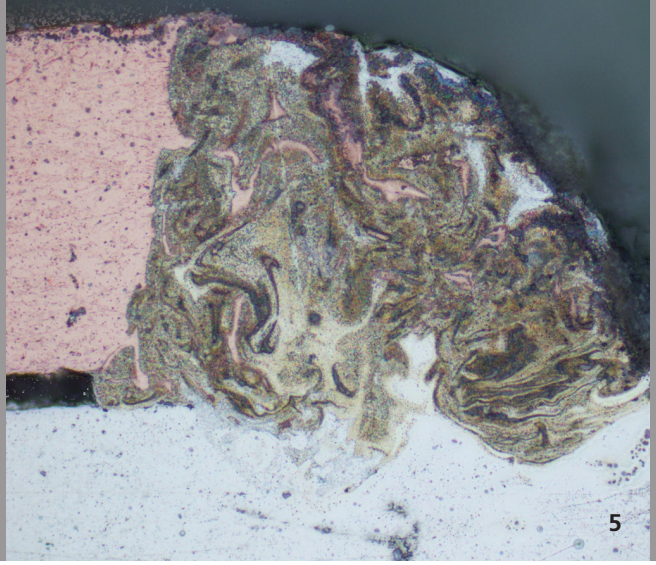

5

LASER-BEAM MICROWELDING OF COPPER BERYLLIUM ON SILVER

Task

When precipitation hardened, copper beryllium alloys can achieve the highest strengths among copper alloys. The high wear resistance, hardness, Young's modulus and high conductivity allow broad applications of copper beryllium alloys in electrical engineering. Here, the spring material properties are paramount when this alloy is compared to highly conductive pure copper materials. In particular, copper components with spring properties in the plug connector industry have to be connected to coated copper plugs. Within a study, laser micro welding was evaluated and qualified in a process comparison with arc and resistance welding.

Method

An overlap fillet weld was used for the process comparison. It used a single-mode fiber laser and a scanner system that allowed rapid spatial power modulation. A beryllium copper strip (d = 0.1 mm) was welded to a silver-coated copper strip (d = 0.2 mm).

Result

The process of the spatial power modulation makes it possible to create a smooth and gentle transition of the fillet weld geometry with sufficient welding depth and connection width. In addition to this homogeneous weld geometry, the process can bridge wider gaps. The cross-section of the weld seam shows how positively spatial power modulation influences the homogeneous joint structure.

Applications

This process can be used, for the most part, to generate electrical contacts for connectors and mechanically stressed contacts in power electronics, the automobile and aircraft industries. In addition to plug-in connections, the main applications can be found in contact technology, springs and switches.

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4 Cross-section 100:1.

5 Cross-section 500:1.