Q&A

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Semblant's Steve McClure Explains Conformal Coatings

Semblant's PlasmaShield plasma conformal coating technology can prevent solids and liquids from coming in contact with electronics. It can protect the electronics from damaging vapors, moisture, pollutant gasses, and salts as well. PlasmaShield also plays a role in the fight against tin whiskers, which can arise while using the tin-based solder that has replaced the more toxic lead-based solder, thanks to the European Union's Restrictions on Hazardous Substances (RoHS). Tin whiskers can cause shorts and other problems, presenting a major issue for military and avionics projects as they move to RoHS parts. Steve McClure, Semblant's vice president of worldwide sales and marketing, recently explained PlasmaShield and conformal coating technology.

WONG: What new advances are available for conformal coatings?

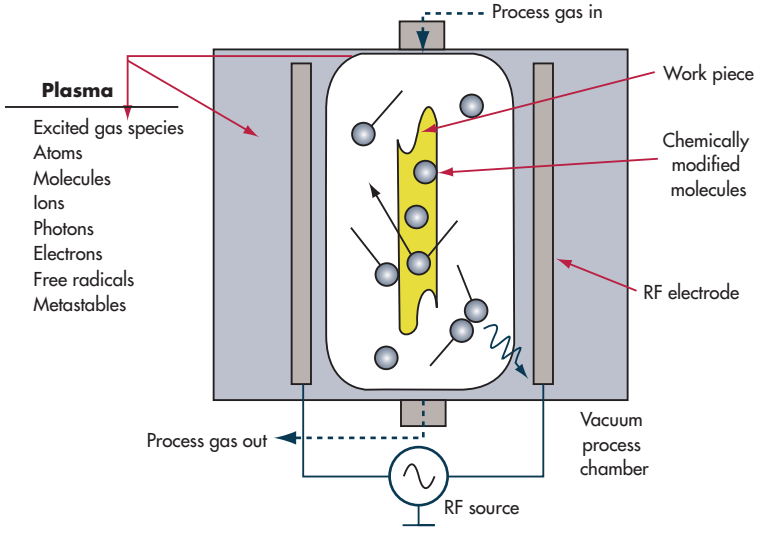
MCCLURE: A new class of conformal coat has been developed using a low-power plasma chamber and depositing an ultra-thin polymer coating. The types of materials that can be deposited using this method range from acrylics to silicones and fluoropolymers. Plasma deposition is a simple, one-step process that can be used to apply a thin, uniform film as a true conformal coating that requires no curing or the use of any solvents. In some cases, this can also remove the requirement for masking contacts and connectors, eliminating a labor- and time-intensive step from the conformal coating process.

Plasma-deposited conformal coating from Semblant now allows products to be coated that could not be coated before. Our advanced materials and material deposition process provides the protection against harmful liquids and gasses with an economic manufacturing process.

WONG: Should electronics manufacturers still consider conformal coating as part of the final electronics design process?

MCCLURE: Yes, but now with plasma deposition, the design rule and "keep-out" requirements of traditional conformal coats can be reduced or eliminated. This provides increased design flexibility and can provide more compact and simplified product design. Without conformal coatings, many electronics would not survive initial field deployment and would succumb to the harsh environments they must survive. Alternatives to conformal coats would be expensive, complex mechanical housings or hermetic seals. Often these would be cost prohibitive or limit the size of the market a product can

Electronics to be coated are placed into a plasma-deposition RF vacuum chamber that operates at room temperature.



serve. Another alternative would be the use of potting compounds. Not only are potting compounds costly, but they limit the practicality of rework. Should something go wrong at final test, the entire unit could be scrapped.

WONG: What factors should be considered when selecting a conformal coating?
MCCLURE: The first consideration should be the environment in which the product must perform—which pollutants, harmful gasses, or liquids could the electronics be exposed to? Once the environmental requirements are understood, the type of components requiring protection should be considered—are there connectors, mechanical devices, LEDs, test points? If so, traditional conformal coats often require masking of these components. With Semblant's plasma-deposited conformal coat, masking can often be eliminated.

WONG: Can you tell us more about the plasma polymerization process for conformal coating?
MCCLURE: Semblant's plasma deposition takes place in an RF vacuum chamber *(see the figure)*. The process operates at room temperature and is a dry process. There is no cure time or time required for cooling or drying. Once the chamber is loaded with electronics to be coated, precursor materials in gas form flow into the chamber. The materials are energized by RF electrodes, and the plasma material deposits in a thin, pinhole-free layer. The thickness and properties of this PlasmaShield can be controlled during the deposition process.

WONG: What are some existing and future applications for conformal coatings?
MCCLURE: Conformal coatings are used across a variety of applications today. For example, industrial controls are often exposed to SO_2 (sulfur dioxide) in the air or to flowing water for cleaning. Both of these can damage sensitive electronics. Similar issues exist in aerospace and medical equipment. Medical equipment is often cleaned with isopropyl alcohol (IPA). In-flight electronics can often be exposed to liquid condensation. In both instances, exposure can damage these electronics.

WONG: What industries will benefit from the technology?
MCCLURE: The flexibility that plasma-deposited conformal coating offers is compelling. Industries using conformal coat today such as industrial, automotive, aerospace, and medical can simplify their manufacturing process, eliminate design restrictions, reduce manufacturing costs, and improve their overall product designs. Industries such as consumer electronics that do not normally use conformal coats due to the manufacturing cost and complexity can now begin to offer products that will be resilient to exposure to liquids such as water, soda, or coffee. ed