

Photovoltaics: highly thermally conductive materials for inverter electronics

Ostfildern-Kemnat, Germany. As a key part of every photovoltaic system, inverters ensure safe and reliable power conversion. Amongst other things, the highly sensitive power electronics – comprised of transformers and chokes – must be resistant to any climatic conditions. At the same time, the increasing use of microinverters requires even more targeted thermal management due to their compact design. Customised potting compounds and adhesives from WEVO-CHEMIE GmbH offer not only the very high thermal conductivity that is a must in such applications but also certification to UL 94 V-0, excellent thermal shock behaviour as well as handling and processing properties that are adaptable to specific applications.

Technological advances regarding solar inverters are also placing growing demands on the materials used – thermal conductivity being just one current example. This is because the high temperatures which occur in the inductors (coils and windings) when the direct current is transformed into alternating current have to be dissipated in a targeted way to guarantee reliable operation over the long term.

Owing to their high thermal conductivity, Wevo's customised potting compounds prevent the inverter from overheating and are able to withstand continuous operating temperatures of up to 130 °C. Their use in microinverters is particularly challenging. To enable these components to be miniaturised, Wevo has come up with special materials with thermal conductivity of 1 W/K·m and flame-retardant properties in accordance with UL 94 V-0.

Safe and reliable power electronics in any climatic conditions

Lifelong stability regardless of the climatic conditions is another significant aspect when it comes to reliable inverter operation. With this in mind, Wevo's polyurethane- and silicone-based materials have been optimised in terms of water absorption. Furthermore, the potting compounds and adhesives exhibit very good temperature shock behaviour.

Customised Wevo adhesives moreover make a vital contribution to inverter durability by keeping the inductors firmly in place and ensuring reliable bonding between the material and the housing thanks to their optimised adhesion properties. In addition to this, noise and vibration are effectively damped.

Materials adapted for production and processing

Apart from factors influencing long-term operation, Wevo also pays particular attention to the customised manufacturing process. For instance, the flowability and curing time (pot life) of the polyurethanes and silicones are optimised depending on customer requirements.

Image description and source

The high temperatures which occur in the solar inverter have to be dissipated using specially adjusted materials (Image source: © romaset – stock.adobe.com).

About Wevo

WEVO-CHEMIE GMBH is an international, independent, family-run chemicals company headquartered in Germany and with further companies in Asia, China and the USA. Wevo develops and manufactures innovative potting applications as well as special bonding and sealing applications based on polyurethane, epoxy and silicone – primarily for applications in electrical and electronic components. Wevo products protect sensitive components against chemicals, vibration, foreign bodies, dust, moisture and high temperatures.

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