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NIPPON SHOKUBAI announces developing Semiconductor Encapsulating Material with Extreme Heat Resistance in applying its proprietary Nano-Technology

NIPPON SHOKUBAI CO., LTD. [Tokyo Stock Exchange - TOKSE:4114.T] ("NIPPON SHOKUBAI") hereby announces that NIPPON SHOKUBAI has developed a new Semiconductor Encapsulating Material with Extreme Heat Resistance using its own nano-hybrid technology*). The new product is expected to be an essential material for SiC power semiconductor device. NIPPON SHOKUBAI has already started supplying a prototype sample and is engaged in establishing a mass production process of the new product.

SiC power semiconductor has the advantage of realizing less electric loss and smaller device volume than conventional Si power semiconductors. Power semiconductor devices are widely used in many applications to control electric usage, however among them, SiC power semiconductor device is especially expected as the most useful one to achieve lower electric power consumption and lower CO2 emission society, and its global market is estimated to expand rapidly with the spread of solar power cell, wind power generator and electric automobiles. For SiC power semiconductor, an encapsulating material having a long term heat resistance over 250℃ has been required as one of the most important constituent materials.

NIPPON SHOKUBAI has developed a series of thermosetting nanocomposite resins**) by using its proprietary Nano-Hybrid technology*). Their molecular structure was designed in controlling chemical interactions between organic polymers and inorganic nanomaterials so that the nanocomposite resins can exhibit not only an excellent heat resistance having glass transition temperature (Tg) of over 250℃ but also excellent mechanical properties and insulating properties. Moreover, NIPPON SHOKUBAI's unique curing system was applied to the nanocomposite resins to crosslink each nanomaterial independently from the crosslinking of the resins. This achieves a construction of interpenetrating network (IPN) in the cured articles, which contributes to increase significantly the heat resistance to a long-term high temperature exposure.

Based on the fundamental technologies as mentioned above, NIPPON SHOKUBAI has developed a new Semiconductor Encapsulating Material with Extreme Heat Resistance with its original formulation technology for maximizing the excellent features of nanocomposite resins. NIPPON SHOKUBAI is prepared to supply both liquid materials for casting and solid materials for transfer-molding***), to cope with any kinds of mounting methods.

NIPPON SHOKUBAI will proceed to optimize the characteristics of the new product by meeting each costumer's needs and aim at a early commercialization of Heat-Resistant Encapsulating Material for SiC power semiconductor.

*) nano-hybrid technology : A technology for preparing a uniform compound on a scale of a nanometer (1:1,000,000,000), obtained by blending or molecularly fusing organic chemicals and inorganic chemicals. This may exhibit unique characteristics that organics only or inorganic only can never achieve, if preparation succeed.

**) nanocomposite resin : A uniform resin obtained by single-dispersing inorganic nanomaterials in polymers. In general, inorganic nanomaterials are easy to aggregate and it is technically difficult for producing nanocomposite resins to disperse a single nanoparticle into organic polymers.

***) transfer-molding : One of the manufacturing method for electronic devises. In a hot mold with electronic part inside, molten solid encapsulating materials are mechanically injected and cured, to produce molded electronic devises. This manufacturing method is widely used for producing many kinds of electronic devises in bulk in a short time.

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