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WANG et al.(10) **Pub. No.: US 2023/0230950 A1**(43) **Pub. Date: Jul. 20, 2023**(54) **SELF-DENSIFYING NANO-SILVER PASTE
AND A METHOD OF FORMING
INTERCONNECT LAYER FOR HIGH
POWER ELECTRONICS**(71) Applicant: **Nano and Advanced Materials
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Hong Kong (HK)(21) Appl. No.: **18/154,033**(22) Filed: **Jan. 12, 2023****Related U.S. Application Data**(60) Provisional application No. 63/300,043, filed on Jan.
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ABSTRACT

A self-densifying interconnection is formed between a high-temperature semiconductor device selected from a GaN or SiC-based device and a substrate. The interconnection includes a matrix of micron-sized silver particles in an amount from approximately 10 to 60 weight percent; the micron-sized silver particles having a particle size ranging from approximately 0.1 microns to 15 microns. Bonding particles are used to chemically bind the matrix of micron-sized silver particles. The bonding particles are core silver nanoparticles with in-situ formed surface silver nanoparticles chemically bound to the surface of the core silver nanoparticles and, at the same time, chemically bound to the matrix of micron-sized silver particles. The bonding particles have a core particle size ranging from approximately 10 to approximately 100 nanometers while the in-situ formed surface silver nanoparticles have a particle size of approximately 3-9 nanometers.

