Nanogranular Compound Material Layers Serve as Storage for Infra-red to Ultra-Violet Photons for the Energy Supply of Electric Machines

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[+]Corresponding author: hans.koops@t-online.de Abstract for ITG Vacuum Electronics 2018 Bad Honnef DE

NASA's "Energy Budget of the Earth", Leob et al. J. Clim, 2009, Treuberth et al. BAMS. 2009, NP-2010-05-265-LaRC. was measured by NASA over 10 years. This indicates that in addition to the sunlight of the earth during the day by the green house molecules in the upper atmosphere in the near infrared essential services in the form of 340 W / m² in the infrared window of the earth's atmosphere are sent directly to Earth during the day and the night. Nanogranular Compound Material Layers can serve as Storage for Infra-red to Ultra-Violet Photons for the Energy Supply of Electric Machines. The fact that the energy is stored in Bosons (electron with hole and antiparallel spin), which allows to store a density of 10^{28} / cm² of Bosons. Using a field gradient along the storage layer renders to emit the electron charge to a storage device or directly to a user. The efficiency of such a storage is 1000 time the efficiency of a superconductor cable cooled to 40 K. Only a very thin cable or sheet material is required, and can be fabricated with parallel operating field emitters for the storage.

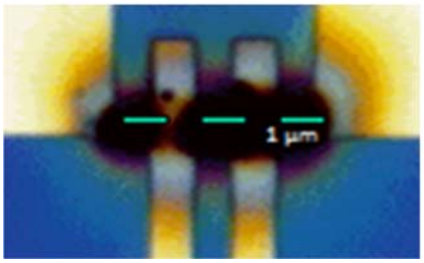

Fig. 1. Nanogranular deposited material absorbs all photons. Green: e-beam trace. Blue:Oxide on Si. Gold: Contacts Black deposited Pt/C material.

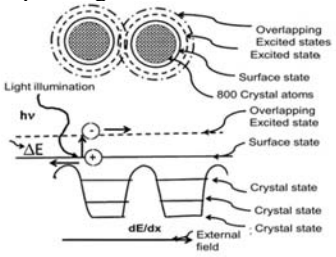

Fig.2: IR- light excites an electron from the Fermi-level (Black) into the exciton state and forms Bosons with parallel spins.

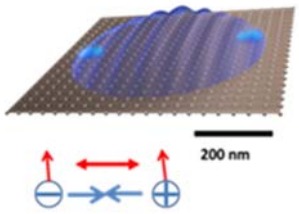

Fig. 3: Electron and hole form a Boson having parallel spins.

The Material and its characteristics has been discovered and measured at Deutsche Telekom Research Center in Darmstadt, Germany [1], and was later name protected [2]. By the explanation of superconductivity by Bardeen, Cooper and Schrieffer electrons having antiparallel spin in the cooled state below 40 K can carry 1 MA/cm² current density. However in our experiments we measured at room temperature in 1994 to 2000 current densities up to 1.4 GA/cm² using Pt/C compounds. Researchers at KNMF of KIT Germany [3] measured between lithographically defined Pt contact lines a current carrying capability of 0,6 A applying 4 V to a ribbon of 1 µm width and 150 nm thickness. At IVNC 2017 Koops and Rangelow showed that the Koops-GranMat® Material has 0 resistances, but the contact areas to normally conducting materials need to be large enough, not to melt the contact material [4,5]. Koops-GranMat® can carry 1,4 GA/cm²!

References

[1] Hans W. P. Koops Applicant "Nano Granular material" The patent family with this title containing a) European Patent Application No. 12 183 564.9 (KOO 7532 EP -.Katscher, Habermann patent attorneys Darmstadt, 13. 04. 2015). b) National applications: China, USA, Germany.

[2] Koops-GranMat® " EU Name Protection recorded in the Register of CommunityTrademarks in EU, 02.10. 2014, No 012719217 OHIM- Office for Harmonization in the Internal Market.Place use the style of the publications of the American Institute of Physics.

[3] A. Machanda, Research Report at Karlsruhe Nano Micro Facility (KNMF) at the Karlsruhe Institute of Technology (KIT) (2016).

[4] Hans W.P. Koops, I.R. Rangelow, IVNC 2017 Regensburg Technical digest.

[5] Hans W.P. Koops, "Hyperriesig leitende nanogranulare Materialien" VIP Vol. 30 Nr.1 -35-39 DOI: 10.1002/vipr. 201 800671