Applications of nano-composite materials carrying GA/cm² current density due to a Bose-Einstein Condensate at room temperature produced by Focused Electron Beam Induced Processing for many extraordinary novel technical applications.

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Abstract

The discovery of Focused Electron Beam Induced Processing (FEBIP) and early applications of this technology led to the possible use of a novel nano-granular material "Koops-GranMat®" using Pt/C and Au/C material, which carries at room temperature a current density > 1000 times the current density which high TC superconductors can carry. The material was discovered in 1994 at FTZ, and can now finally be explained as a Bose Einstein Condensate at room temperature. The explanation for the characteristics of this novel material is given. It is discussed why FEBIP- systems with GDSII pattern lithography did not find the novel materials. However using Dual Beam systems having a gas supply and X,Y,T stream data programming all could fabricate this material. This fact allows producing novel products for many applications.
Products are for energy transportation, -distribution,-switching, photon-detection above 65 meV energy for very efficient energy harvesting, for bright field emission electron sources used for vacuum electronic devices like amplifiers for HF electronics, micro-tubes, 30 GHz to 6 THz switching amplifiers with signal to noise ratio >10(!), THz power sources up to 1 Watt, in combination with miniaturized vacuum pumps, vacuum gauges, IR to THz detectors, EUV- and X-Ray sources. Focusing electron beam induced deposition works also at low energy to build self- cloning multi-beam-production machines for field emitter lamps, displays, multi-beam -lithography, - imaging, and - inspection, energy harvesting, and power distribution with switches controlling field-emitter arrays for KA of currents but with < 100 V switching voltage are possible. A magnetic field detector working at room temperature, which is built like a Josephson detector is under construction and test. Miniaturized X-ray tubes for brachytherapy and also very powerful soft X-ray sources for EUV lithography can be built. With such sources a breakthrough to lithography with high productivity is possible.
Finally the replacement of HTC superconductors and its applications by the Koops-GranMat® having Koops-Pairs at room temperature will revolutionize the optical, electric and electronic technology.

References

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