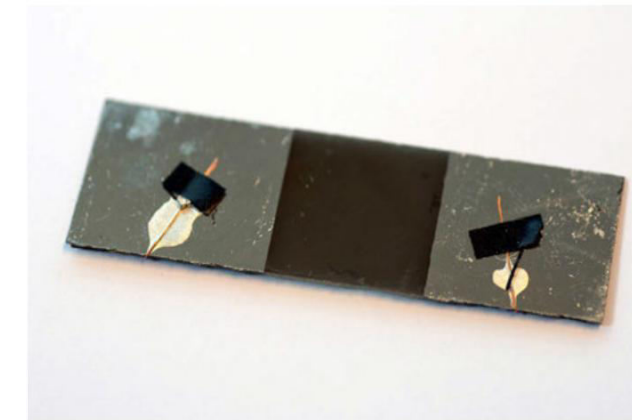
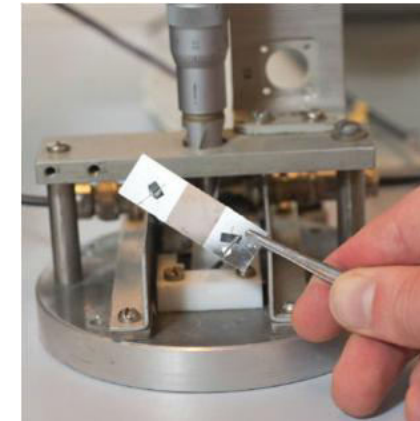


Functional Molecules and Materials

# Diamond-like Carbon Nanocomposites and Micro/Nanocomposite Structures with Extraordinary Piezoresistance



### [contacts]

KTU National Innovation and Entrepreneurship Centre  
59 K. Baršausko St. Kaunas, Lithuania  
+370 695 37440,  
info@nivc.lt nivc.ktu.edu

Order Laboratory Equipment and Scientific and Applied Research apcis.ktu.edu

### [application areas]

Sensors.

[year of invention] 2013.

### [authors]

Dr. Rimantas Gudaitis,  
Dr. Šarūnas Meškėnis.

### [features, technical specifications]

The work aims to form, research and apply new diamond-like carbon nanocomposite structures with piezoresistive gauge factor and zero temperature coefficient to the formation of strain sensors. The work studied diamond-like carbon coatings containing silver (DTAD:Ag), diamond-like carbon coatings containing copper (DTAD:Cu), and diamond-like carbon coatings containing nickel (DTAD:Ni), deposited by the reactive magnetron sputtering method: (DS) magnetron sputtering and high-power pulsed

magnetron sputtering. The detailed analysis of composition, structure of the films was performed in dependence on the technological conditions. It was found that the gauge factor of the films depends on the matrix structure of diamond-like carbon, on Cu, Ni and Ag atomic concentration and on the dimensions of metallic nanoclusters in the deposited DTAD:Me films. Various lithography technologies were used for the formation of an electrode and DTAD (micro) drawing, technological issues were identified, and proper formation technologies were selected.

### [novelty]

Piezoresistive properties of DTAD with embedded silver nanoparticles and DTAD with copper nanoclusters have been examined for the first time.

### [alternatives]

None.

### [technological readiness level]

A product model. The project is scheduled until 30/09/2015.

### [what are we looking for in this stage of development?]

Funding for further research and completion of the prototype; R&D orders related to the invention; partners from scientific institutions for joint research.

### [patenting]

Patentability analysis required.

### [commercialisation]

The project is still in progress. Optimisation works are ongoing.