Annotations of Doctoral Thesis Topics for Degree Course in ''Nanotechnology and Advanced Materials'' for the Academic Years since 2019/2020

Topic:	**Thermoelectric materials based on nanostructured polymer composites**
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Annotation:

Combinations of polymer composite containing electrically conductive fillers can create a novel thermometric materials that are completely organic based, are lightweight, flexible and stretchable. This is done by controlled modification of the electronic properties of the filler, e.g., carbon nanotubes, using chemical functionalization or plasma assisted treatment. Thus, there is a modification of the semiconducting nature of the fillers in terms of the concentration of charge carriers, which are becoming more p or n. Assembled organic thermocouples then generate thermoelectric voltages when inserting the temperature difference between cold and warm ends. But they can also serve as an active vapour or deformation detectors when generated thermoelectric voltages are changed by the presence of vapours or by applied strain.

Requirements:

Finished university studies in a degree of MSc. or Ing. of technical type, basic ability to communicate in English language.

Literature:

1. Slobodian, P. Riha, R. Olejnik, R. Benlikaya. Analysis of sensing properties of thermoelectric vapor sensor made of carbon nanotubes/ethylene-octene copolymer composites. Carbon 110, 2016, 110 257-266.
2. Slobodian P., Riha P., Olejnik R., Kovar M., Svoboda P., Thermoelectric Properties of Carbon Nanotube and Nanofiber Based Ethylene-Octene Copolymer Composites for Thermoelectric Devices, J Nanomater (2013), Article Number:792875.
3. Slobodian P, Riha P, Lengalova A, Svoboda P, Saha P. Multi-wall carbon nanotube networks as potential resistive gas sensors for organic vapor detection. Carbon 2011;49:2499-2507.
4. Benlikaya, R.; Slobodian, P; Riha, P; Olejnik, R. The enhanced alcohol sensing response of multiwalled carbon nanotube networks induced by alkyl diamine treatment SENSORS AND ACTUATORS B-CHEMICAL 201, 122-130, 2014.