Annotations of Doctoral Thesis Topics for Degree Course in „Nanotechnology and Advanced Materials“ for the Academic Year 2017/2018

Topic: Stereolithography printing by polymer nanocomposite materials

Tutor: **prof. Ing. Petr Slobodian, Ph. D.**

Consultant:

E-mail: **slobodian@ft.utb.cz**

Annotation:

3D printing is a promising production technology for fabrication of three-dimensional objects. This technology has the significant advantage compared to conventional techniques based on machining. The product is made by successive application of material processed according to predetermined computer model. According to this advantage it is possible to fabricate very complex shaped products, with shape variability and velocity of realization from design to production, in addition with a relatively low cost of implementation. Finally, advanced printing materials for polymer composites 3D printing can represent a significant innovation in this market segment and special properties and quality of printed products as mechanical, electrical and optical properties can be achieved. Photo-polymerization batch containing nanofillers can then be used to print new functional composites that are applicable for example in the field of sensors or thermoelectric nanomaterials.

Requirements:

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

Literature:

1. WENG, Zixiang, Yu ZHOU, Wenxiong LIN, T. SENTHIL a Lixin WU. Structure-property relationship of nano enhanced stereolithography resin for desktop SLA 3D printer. *Composites Part A: Applied Science and Manufacturing* [online]. 2016, **88**, 234-242 [cit. 2017-01-02]. DOI: 10.1016/j.compositesa.2016.05.035. ISSN 1359835x. Dostupné z: http://linkinghub.elsevier.com/retrieve/pii/S1359835X16301725
2. MA, Xue Liang. Research on Application of SLA Technology in the 3D Printing Technology. *Applied Mechanics and Materials* [online]. 2013, **401-403**, 938-941 [cit. 2017-01-02]. DOI: 10.4028/www.scientific.net/AMM.401-403.938. ISSN 1662-7482. Dostupné z: http://www.scientific.net/AMM.401-403.938
3. HELVAJIAN, Henry, Alberto PIQUÉ, Martin WEGENER, et al. *Advantages and drawbacks of Thiol-ene based resins for 3D-printing* [online]. In: . 93530F- [cit. 2017-01-02]. DOI: 10.1117/12.2081169. Dostupné z: http://proceedings.spiedigitallibrary.org/proceeding.aspx?doi=10.1117/12.2081169
4. Allen, N.S., 1996. Photoinitiators for UV and visible curing of coatings: mechanisms and properties. J. Photochem. Photobiol. A: Chem. 100, 101–107.
5. Chua, C.K., Leong, K.F., 2015. 3D Printing and Additive Manufacturing: Principles and Applications. World Scientific Publishing, Singapore.
6. SLOBODIAN, Petr, OLEJNÍK, Robert, MATYÁŠ, Jiří, DOLEČEK, Josef. Poloprovozní příprava CNT polymerního koncentrátu: Výroba elektro-vodivé struny pro 3d prototyping na bázi ABS/uhlíkových nanotrubic nano-kompozitního materiálu. Poloprovoz, 2014.