Universitatea Transilvania din Brașov

Școala Doctorală Interdisciplinară

ADMITERE DOCTORAT Sesiunea Septembrie 2022

Domeniul de doctorat: Ingineria Materialelor

Conducător de doctorat: Prof. dr. ing. Mircea Horia ȚIEREAN

TEME (TEMATICĂ) PENTRU CONCURS

TEMA 1: *Sinteza nanoparticulelor prin ablație laser*

Conținut / Principalele aspecte abordate

- *Obținerea nanoparticulelor de Ag, Ti, Zn prin ablație*
- *Caracterizarea nanoparticulelor obținute*

Bibliografie recomandată:

1. Blažeka, D., Car, J., Krstulović, N., Concentration Quantification of TiO2 Nanoparticles Synthesized by Laser Ablation of a Ti Target in Water. *Materials*, 2022, 15(9), 3146. https://doi.org/10.3390/ma15093146.
2. Dell'Aglio, M., Gaudiuso, R., De Pascale, O., De Giacomo, A., Mechanisms and processes of pulsed laser ablation in liquids during nanoparticle production, *Applied Surface Science*, 2015, 348, 4-9, https://doi.org/10.1016/j.apsusc.2015.01.082.
3. Amin, M., Tomko, J., Naddeo, J.J., Jimenez, R., Bubb, D.M., Steiner, M., Fitz-Gerald, J., O'Malley, S.M., Laser-assisted synthesis of ultra-small anatase TiO2 nanoparticles, *Applied Surface Science*, 2015, 348, 30-37, https://doi.org/10.1016/j.apsusc.2014.12.191.
4. Gentile, L., Mateos, H., Mallardi, A. *et al.* Gold nanoparticles obtained by ns-pulsed laser ablation in liquids (ns-PLAL) are arranged in the form of fractal clusters. *J Nanopart Res, 2021,* 23, 35, https://doi.org/10.1007/s11051-021-05140-5.
5. Car, J., Blažeka, D., Bajan, T. *et al.* A quantitative analysis of colloidal solution of metal nanoparticles produced by laser ablation in liquids. *Appl. Phys. A,* 2021, 127, 838, https://doi.org/10.1007/s00339-021-04966-z.
6. Krstulović, N., Salamon, K., Budimlija, O., Kovač, J., Dasović, J., Umek, P., Capan, I., Parameters optimization for synthesis of Al-doped ZnO nanoparticles by laser ablation in water, *Applied Surface Science*, 2018, 440, 916-925, https://doi.org/10.1016/j.apsusc.2018.01.295.
7. Nikov, Ro.G., Nedyalkov, N.N., Karashanova, D.B., Laser ablation of Ni in the presence of external magnetic field: Selection of microsized particles, *Applied Surface Science*, 2020, 518, 146211, https://doi.org/10.1016/j.apsusc.2020.146211.

Note /Precondiții / Obs.: *Studii absolvite: Inginerie, Fizică, Chimie, Matematică, Informatică*

TEMA 2: *Influența materialelor și a parametrilor tehnologici asupra proprietăților pieselor tipărite 3D prin extrudare*

Conținut / Principalele aspecte abordate

- *Caracterizarea structurală, mecanică, calorimetrică*
- *Determinarea porozității*
- *Caracterizarea biocompatibilității (penetrabilitatea microorganismelor, creșterea celulelor, dezinfecția)*

Bibliografie recomandată:

1. Anderson, E.H., The Effect of Porosity on Mechanical Properties of Fused Deposition Manufactured Polymers and Composites, 2019, Master's Theses. 4992, https://doi.org/10.31979/etd.rkaj-q4tv.
2. Carneiro, O.S., Silva A.F., Gomes, R., Fused deposition modeling with polypropylene, *Materials & Design,* 2015, 83, 768–776, https://doi.org/10.1016/j.matdes.2015.06.053
3. Chacón, J.M., Caminero, M.A., García-Plaza, E. P., Núñez, J., Additive manufacturing of PLA structures using fused deposition modelling: Effect of process parameters on mechanical properties and their optimal selection, *Materials & Design*, 2017, 124, 143–157, https://doi.org/10.1016/j.matdes.2017.03.065
4. Ferreira, R.T.L., Cardoso Amatte, I., Assis Dutra, T., Bürger, D., Experimental characterization and micrography of 3D printed PLA and PLA reinforced with short carbon fibers, *Composites Part B*, 2017, 124, 88-100, https://doi.org/10.1016/j.compositesb.2017.05.013.
5. Gordeev, E.G., Galushko, A.S., Ananikov, V.P., Improvement of quality of 3D printed objects by elimination of microscopic structural defects in fused deposition modeling*, Plos One*, 2018, https://doi.org/10.1371/journal.pone.0198370.
6. Liao, Y., Liu, C., Coppola, B., Barra, G., DiMaio, L., Incarnato, L., Lafdi, K., Effect of Porosity and Crystallinity on 3D Printed PLA Properties, *Polymers*, 2019, 11(9):1487, https://doi.org/10.3390/polym11091487.
7. Song, Y., Li, Y., Song, W., Yee, K., Lee, K.-Y., Tagarielli, V.L., Measurements of the mechanical response of unidirectional 3D-printed PLA, *Materials and Design*, 2017, 123, 154–164, https://doi.org/10.1016/j.matdes.2017.03.051.
8. Srivastava, V.K., A Review on Advances in Rapid Prototype 3D Printing of Multi-Functional Applications, *Science and Technology* 2017, 7(1): 4-24, http://article.sapub.org/10.5923.j.scit.20170701.02.html.
9. .Tanikella, N.G., Wittbrodt, B., Pearce, J.M., Tensile strength of commercial polymer materials for fused filament fabrication 3D printing, *Additive Manufacturing* , 2017, 15, 40–47, https://doi.org/10.1016/j.addma.2017.03.005.
10. Zekavat, A R., Jansson, A., Larsson, J., Pejryd, L., Investigating the effect of fabrication temperature on mechanical properties of fused deposition modelling parts using X-ray computed tomography, *The International Journal of Advanced Manufacturing Technology*, 2018, 100, 287–296, https://doi.org/10.1007/s00170-018-2664-8.

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