



ADMISSION TO DOCTORAL STUDIES

Session September 2023

Field of doctoral studies: Materials engineering

Doctoral supervisor: Prof. dr. chem. Cătălin Croitoru

TOPICS FOR THE ADMISSION TO DOCTORAL STUDIES

TOPIC 1: *Multifunctional polymeric matrix composite materials incorporating natural additives and auxiliaries*

Content / Main aspects to be considered

- Obtaining polymeric and composite materials
- Characterizing the morphology, structure, composition, and interaction between the components of the polymeric or composite system.
- Evaluating the criteria for the application areas of the obtained materials.

Recommended bibliography:

1. Rahman, R. (editor). Advances in Sustainable Polymer Composites. Elsevier Science, 2020. ISBN: 978-0-12-820342-2.
2. Sabu, T.; Kuruvilla, J; Malhotra, K.; Goda, K.; Sreekala, M.S (editors). Polymer Composites, Biocomposites. Wiley, 2013. ISBN: 978-3-527-67424-4.
3. Inamuddin, N. (editor). Green Polymer Composites Technology. CRC Press, 2016. ISBN: 978-1-31-535400-2.

Prerequisites / Remarks: *studies in engineering, chemistry, physics*

TOPIC 2: *Functional hydrogel materials based on synthetic polymers and biopolymers*

Content / Main aspects to be considered

- Obtaining of chemical/physical crosslinked hydrogels from synthetic and/or natural polymers for environmental depollution applications (adsorbent materials for organic compounds and heavy metal ions from wastewaters), sensoristics and controlled release of active ingredients;
- Characterization of the morphology, structure, composition and interaction between the components of the hydrogel system.

Recommended bibliography:

1. Ninago, M.D.; López, O.V.; Horst, M.F. The Applications of Hydrogels. 2021, ISBN: 978-1-68507-219-3.
2. Thakur, V.K.; Thakur, M.K (editori). Hydrogels: Recent Advances. Springer, 2018. ISBN: 978-981-10-6077-9.
3. Haider, S.; Haider, A. (editori) Hydrogels. IntechOpen, 2018. ISBN: 978-1-78923-368-1.

4. Chu, Y. *Hydrogels Based on Natural Polymers*. Elsevier, 2020. ISBN: 978-0-12-816421-1.
Oliveira Monteiro da Silva Abreu, F. *Physical Hydrogels for Drug Delivery Applications: Physical Hydrogels*. Eliva Press, 2022. ISBN: 978-1-63648-153-1.

Prerequisites / Remarks: *studies in engineering, chemistry, physics or pharmacy*

TOPIC 3: *Development of multifunctional thin films using the sol-gel technique*

Content / Main aspects to be considered

- Development and optimization of precursor formulations for obtaining thin films using sol-gel technique
- Characterization of the functional coatings obtained through sol-gel technique (morpho-structural, etc.) and recommendation for different applications.

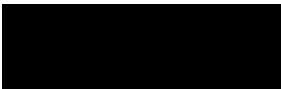
Recommended bibliography:

1. Klein, C.L. (editor). *Sol-Gel Technology for Thin Films, Fibers, Preforms, Electronics and Specialty Shapes*, Elsevier Science, 1988. ISBN: 978-0-815-51154-0.
2. Chandra, U (editor). *Recent Applications in Sol-Gel Synthesis*. IntechOpen, 2017. ISBN: 978-9-535-13245-5.
3. Attia, Y.A. (editor). *Sol-Gel Processing and Applications*. Springer, 2012. ISBN: 978-1-461-52570-7.

Prerequisites / Remarks: *studies in engineering, chemistry, physics*

Doctoral supervisor,

Assoc. Prof. dr. chem. Cătălin Croitoru



Coordinator of the field of doctoral studies,

Prof. Dr. Eng. Mircea Horia Țierean

