



Şcoala Doctorală Interdisciplinară
(SDI)

Domeniul de doctorat:
Inginerie Mecanică
Conducător doctorat:
Prof. dr. habil. ing. Gabriela HUMINIC

TEME (TEMATICĂ) PENTRU CONCURS

TEMA 1: *Contribuții la studiul caracteristicilor de transfer de căldură și de curgere ale lichidelor ionice utilizate în colectoare solare*

Conținut / Principalele aspecte abordate:

Dezvoltarea de noi lichide ionice și utilizarea acestora în colectoare solare în vederea îmbunătățirii performanțelor de funcționare.

Bibliografie recomandată:

1. E.B. Fox, A.E. Visser, N.J. Bridges and J.W. Amoroso, Thermophysical properties of nanoparticle-enhanced ionic liquids (NEILs) heat-transfer fluids, *Energy Fuels*, 27 (2013) 3385–3393.
2. J. Alizadeh and M.K. Morajevi, An experimental evaluation on thermophysical properties of functionalized graphene nanoplatelets ionanofluids, *International Communications in Heat and Mass Transfer*, 98(2018) 31–40.
3. J. Liu, F. Wang, L. Zhang, X. Fang and Z. Zhang, Thermodynamic properties and thermal stability of ionic liquid-based nanofluids containing graphene as advanced heat transfer fluids for medium-to-high-temperature applications, *Renewable Energy*, 63 (2014) 519-523
4. J.M.P. França, M.J.V. Lourenço, S.M.S. Murshed, A.A.H. Pádua and C.A. Nieto de Castro, Thermal Conductivity of Ionic Liquids and Ionanofluids and Their Feasibility as Heat Transfer Fluids, *Industrial & Engineering Chemistry Research*, 57(2018) 6516–6529.
5. C.T. Paul, A.K.M.M. Morshed, E.B. Fox and J.A. Khan, Enhanced thermophysical properties of NEILs as heat transfer fluids for solar thermal applications, *Applied Thermal Engineering*, 110 (2017) 1–9.

TEMA 2: *Contribuții la studiul caracteristicilor de transfer de căldură și de curgere ale fluidelor de lucru multifazice utilizate în schimbătoare de căldură cu plăci*

Conținut / Principalele aspecte abordate:

Dezvoltarea de noi fluide de lucru bifazice și utilizarea acestora în schimbătoare de căldură cu plăci în vederea îmbunătățirii performanțelor de funcționare.

Bibliografie recomandată:

1. Y. Cengel, A. Ghajar, *Heat and Mass Transfer*, ISBN: 0073398187, 2015.
2. S. Kakac, H. Liu, *Heat Exchangers, Selection, Rating and Thermal Design*, CRC Press, 2002.
3. G. Huminic, A. Huminic, Hybrid nanofluids for heat transfer applications – A state-of-the-art review, *International Journal of Heat and Mass Transfer* 125 (2018) 82–103.
4. G. Huminic, A. Huminic, F. Dumitrache, C. Fleaca, I. Morjan, Study of the thermal conductivity of hybrid nanofluids: recent research and experimental study, *Powder Technology* 367 (2020) 347–357.

Conducător doctorat:

Prof.dr.habil.ing. Gabriela HUMINIC

Interdisciplinary Doctoral School
(SDI)

Field of doctoral studies:
Mechanical Engineering
PhD supervisor:
Prof.dr.habil.ing. Gabriela HUMINIC

TOPICS FOR THE ADMISSION TO DOCTORAL STUDIES

TOPIC 1: *Contributions to the study of heat transfer and flow characteristics of ionic liquids used in solar collectors*

Content / Main aspects to be considered: Development of new ionic liquids and their use in solar collectors in order to improve operating performance.

Recommended bibliografy:

1. E.B. Fox, A.E. Visser, N.J. Bridges and J.W. Amoroso, Thermophysical properties of nanoparticle-enhanced ionic liquids (NEILs) heat-transfer fluids, *Energy Fuels*, 27 (2013) 3385–3393.
2. J. Alizadeh and M.K. Morajevi, An experimental evaluation on thermophysical properties of functionalized graphene nanoplatelets ionanofluids, *International Communications in Heat and Mass Transfer*, 98(2018) 31–40.
3. J. Liu, F. Wang, L. Zhang, X. Fang and Z. Zhang, Thermodynamic properties and thermal stability of ionic liquid-based nanofluids containing graphene as advanced heat transfer fluids for medium-to-high-temperature applications, *Renewable Energy*, 63 (2014) 519-523
4. J.M.P. França, M.J.V. Lourenço, S.M.S. Murshed, A.A.H. Pádua and C.A. Nieto de Castro, Thermal Conductivity of Ionic Liquids and Ionanofluids and Their Feasibility as Heat Transfer Fluids, *Industrial & Engineering Chemistry Research*, 57(2018) 6516–6529.
5. C.T. Paul, A.K.M.M. Morshed, E.B. Fox and J.A. Khan, Enhanced thermophysical properties of NEILs as heat transfer fluids for solar thermal applications, *Applied Thermal Engineering*, 110 (2017) 1–9.

TOPIC 2: *Contributions to the study of heat transfer and flow characteristics of hybrid nanofluids used in plate heat exchangers*

Content / Main aspects to be considered: Development of new hybrid nanofluids and their use in plate heat exchangers in order to improve operating performance.

Recommended bibliografy:

1. Y. Cengel, A. Ghajar, *Heat and Mass Transfer*, ISBN: 0073398187, 2015.
2. S. Kakac, H. Liu, *Heat Exchangers, Selection, Rating and Thermal Design*, CRC Press, 2002.
3. G. Huminic, A. Huminic, Hybrid nanofluids for heat transfer applications – A state-of-the-art review, *International Journal of Heat and Mass Transfer* 125 (2018) 82–103.
4. G. Huminic, A. Huminic, F. Dumitrache, C. Fleaca, I. Morjan, Study of the thermal conductivity of hybrid nanofluids: recent research and experimental study, *Powder Technology* 367 (2020) 347–357.

PhD supervisor:

Prof.dr.habil.ing. Gabriela HUMINIC

