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

Topic: **Intelligent Electrorheological Fluids**

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Annotation:

Specially designed suspensions sensitive to electric field can very fast and reversibly change their rheological properties in a controlled way. Under external electric field particles in suspension reorganize (suspension solidifies) and viscosity, yield stress or shear moduli increase several orders of magnitude. When external field is replaced suspensions recover their fluidity. Because of their unique properties such materials are called “smart fluids”. High potential is expected in development of haptic display, fine robotics etc. Main aim of Ph.D. thesis will be concentrated to preparation of new types of fluids using conducting polymers (polyaniline, polypyrrole, polyindole) or using materials modified with conducting polymers (silica, graphene oxide etc.) and characterization of their properties.

Requirements:

Good knowledge of English, creative abilities, skills for working in physical chemical laboratory.

Literature:

1. HAO, T. Electrorheological Fluids, The Non-aqueous Suspensions, Elsevier B.V., 2005, Amsterdam, The Netherlands. ISBN 978-0-444-52180-4.
2. SCHWARTZ, M. Encyclopedia of Smart Materials, John Wiley & Sons Inc., 2002, New York, USA. ISBN 0-471-17780-6.
3. LU, K.; SHEN, R.; LIU, J. Electrorheological Fluids and Magnetorheological Suspensions, World Scientific Publ., 2005, Singapore. ISBN 981-256-122-6.