
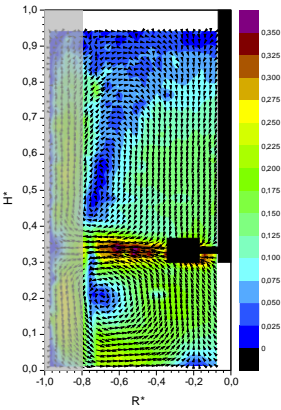





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name of the unit: DEPARTMENT OF CHEMICAL ENGINEERING Faculty of Process and Environmental Engineering, Lodz University of Technology		symbol: K-93 https://www.wipos.p.lodz.pl/Katedra_Inzynierii_Chemicznej_K93,559
head of the unit: Piotr Owczarz, PhD, DSc, TUL Prof.	potential promoters: Andrzej Obraniak, PhD, DSc, TUL Prof. Piotr Owczarz, PhD, DSc, TUL Prof. Remigiusz Modrzewski, PhD, DSc Magdalena Orczykowska, PhD, DSc Jacek Stelmach, PhD, DSc	contact person: Piotr Owczarz PhD, DSc, TUL Prof. tel: 42-631-37-32 piotr.owczarz@p.lodz.pl
scope of activities: <ul style="list-style-type: none">Hydrodynamics of single and multiphase media flows with complex rheological propertiesTransport of dispersed systems through microporous structuresInvestigation of the fluid mixing process in homogeneous and heterogeneous systemsRheology and rheometry of liquids and granular materials. Application of rheological measurements to control and automation processes. Development of new methods for measuring rheological properties of complex systems.Stability of dispersed systems (emulsions, micro-suspension, etc.) and the migration phenomena of such systems through porous structuresIndustrial processes with granular materials: micromilling, granulation of powders and dusts in drum and disc granulator, separation processes (wet or dry) in various types of screens		graphic material   
present activities: <p>The main areas of research currently carried out at the Department concern :</p> <ul style="list-style-type: none">engineering of colloidal systems, studies of the rheological properties of dispersed systems, incl. polysaccharide hydrocolloids, micro suspensions and emulsions;determination of (micro)structural using light scattering techniquesdynamics of multiphase media flows with complex rheological properties through porous and microcapillary structures: microfiltration, intensification of extraction of liquid deposits, soil remediation;intensification of the mixing process using mixers of various designs, application of CFD simulations to describe the mixing processes;operations with granular materials, including development of a technology for granulation of lime, lime-gypsum and lime-dolomite fertilizers carried out in batch or continuous mode in drum, disc, mixer or two-stage technology granulator and screening and granulation of waste tanning shavings for re-use in the footwear industry).		
Future activities: <p>continuation of current research directions including methods of active and passive microrheology; rheology of granular materials and beds, including the processes of their mixing and transport; the use of CFD methods for the description of flow processes; flow-driven production of nano- and microgranules, spraying of non-Newtonian liquids, transport of bioactive substances in the human body, the dynamics of blood flow, application of microstructures for pharmaceutical applications</p>		
Publications/patents, awards, projects: <ul style="list-style-type: none">Owczarz P., Orczykowska M., Rył A., Ziółkowski P. (2019). The effects of sucrose on the sol-gel phase transition and viscoelastic properties of potato starch solutions. Food Chemistry, vol. 271, pp. 94-101.Rył, A., and Owczarz, P. (2021). Thermoduced aggregation of chitosan systems in perikinetik and orthokinetik regimes. Carbohydrate Polymers, 255, 117377.		



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- Stelmach, J., Kuncewicz, C., Szufa, S., Jirout, T., and Rieger, F. (2021). The Influence of Hydrodynamic Changes in a System with a Pitched Blade Turbine on Mixing Power. *Processes*, 9(1), 68.
- Błaszczuk, M.M., Sęk, J.P., Przybysz, Ł. (2020). Modeling and experimental data of the flow of highly concentrated emulsions in porous media, *Engineering Science and Technology, an International Journal*, 23(6), pp. 1444–1454.
- Ławińska K., Szufa S., Modrzewski R., Obraniak A., Wężyk T., Rostocki A., Olejnik T. (2020). Obtaining granules from waste tannery shavings and mineral additives by wet pulp granulation, *Molecules*, vol. 25, 5419, pp.1-13.
- Method for producing agglomerate from tanning shavings – patent RP nr 236818 and 236819

Keywords:

multiphase flows, non-Newtonian liquids, rheology, emulsions, mixing, granulation, screening

List of internship proposal in this research team:

- rheology and fluid dynamics in biomedical application
- non-pressure granulation processes of mineral materials and industrial waste