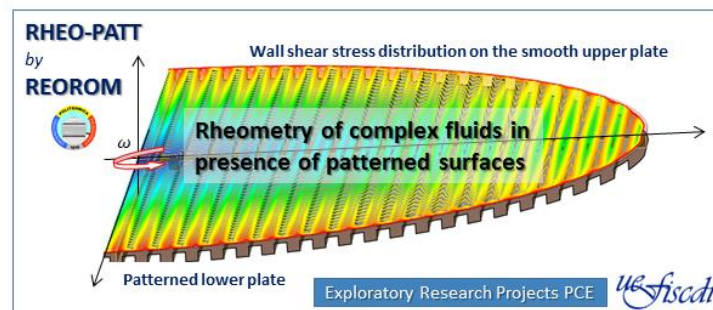


Project Title:

RHEOMETRY OF COMPLEX FLUIDS IN THE PRESENCE OF PATTERNED SURFACES

Project acronym: RHEO-PATT

Project highlight Figure:



Finance Source: UEFISCDI - Executive Agency for Higher Education, Research, Development and Innovation (UEFISCDI is a public institution with legal personality subordinated to the Ministry of National Education)

Project type: Exploratory Research Projects PCE

Project code: PN-II-ID-PCE-2012-4-0245

Beneficiary Institution: Politehnica University of Bucharest, Romania

Contract Number: 20/03/09/2013

Period: 2013 – 2016

Total Budget: 900000 Lei (\approx 205000 Euro)

Beneficiary Research Unit: REOROM Laboratory

Project Leader: Professor Corneliu Balan/Politehnica University of Bucharest (see enclosed CV)

Contact: corneliu.balan@upb.ro

Summary

The research project is focused on a very actual topic in rheology and non-Newtonian fluid mechanics: dynamics analysis and rheological characterization of complex fluids in vicinity of patterned/structured surfaces.

The main goal of the project is to establish the experimental procedures to characterize the rheology of complex fluids in rotational rheometers, where the plates are patterned with controlled structured micro-geometries.

We are looking to understand and to quantify the wall depletion phenomena in relation to the wall micro-geometry and material bulk properties. The distinction between real slip at the boundary and bulk material instability of complex fluids is one of the most challenging problem in rheometry.

We search to give an answer to a main question in rheology: Is a complex fluid characterized by one single constitutive relation, or such materials have a special constitutive relation on the surface, which might be different from the bulk? Actually, we try to elucidate if is any relation between the boundary conditions and the material macroscopic constitutive relation. The influences of local wall micro-geometry on the measured stresses/velocities distributions are studied for some families of complex fluids, samples with controlled chemical formulation and well defined surface properties. Our project is a fundamental research in the rheology of complex fluids with direct impact in developing novel directions for the design of rotational rheometers.

Main objective

To establish a novel experimental procedure for the rheological characterization of simple and complex fluids in the presence of patterned surfaces and to formulate a general constitutive relation for the modelling of fluid behavior in the very vicinity of the solid surface.

Keywords: Rheology/Rheometry/Complex fluids/Microfluidics/non-Newtonian fluid mechanics

Budget

NR. CRT	Budget chapter (expenses)	2013 (lei)	2014 (lei)	2015 (lei)	2016 (lei)	TOTAL (lei)
1.	Salaries	55275.81	100000	172308	45000	372583.81
2.	Overhead	19106.19	34600	43422	20069	117197.19
3	Mobility	666	27400	34600	10000	72666
4.	Inventory	72925	75264	89364	100000	337553
	TOTAL	147973	237264	339694	175069	900000