КОЛОКВИУМ „АЛЕКСЕЙ ШЕЛУДКО”
СЕКЦИЯ „ПОВЪРХНОСТИ И КОЛОИДИ”
ИНСТИТУТ ПО ФИЗИКОХИМИЯ НА БАН

С Ъ О Б Щ Е Н И Е

На **15 октомври 2021 г. (петък) от 11:00 часа** ще се проведе **виртуално заседание (Zoom meeting)** на Колоквиума със следния дневен ред:

1. Доклад на Пламен Чуков на тема:

“ ASPHALTENE STRUCTURES AND RHEOLOGY IN NANO/MICRO-SCALE CONFINEMENTS“

Asphaltene fraction is the key factor controlling rheological behaviour of heavy crude oil [1]. In poor solvents (high aliphatic content), the asphaltenes self-assemble and form hierarchical structures like nanoaggregates, clusters of nanoaggregates, and extended 3D network [2]. Such aggregation behaviour can have significant practical implications, especially in systems with confined geometry of nanoscale dimensions. It is recognized that bulk rheological properties measured using conventional techniques don’t always represent fluid flow at such micro-/nano-scale dimensions. Here, we study the drainage kinetics of thin liquid water-in-oil emulsion films and capillary driven flow in microfluidic device to understand heavy oil rheology at micro-/nano-scale [1-3]. Both systems’ characteristic lengths are below 100 nm. At poor solvent conditions, asphaltene aggregation causes non-Newtonian behaviour of heavy crude oil with Bingham yield stress. Our estimates show that the Bingham yield stress of such a fluid may be too small to be measured by conventional rheological methods and manifests itself in bulk systems. However, it is still significant to induce dramatic changes in properties of water-in-oil emulsions and heavy oil flow in micro-/nano-porous media. These results demonstrate the potential of using the thin liquid film technique and microfluidics platforms with suitable theoretical models to study rheological properties of complex liquids in nanoscale confinements.

[1] P. Tchoukov et al., Langmuir, 30 (2014) 3024.
[2] J. Czarnecki et al., Can. J. Chem. Eng., 91 (2013) 1365.
[3] S. Mozaffari et al., Energy Fuels, 35 (2021) 9080.

2. Разни (съобщения, организационни и др. въпроси).