КОЛОКВИУМ „АЛЕКСЕЙ ШЕЛУДКО”

СЕКЦИЯ „ПОВЪРХНОСТИ И КОЛОИДИ”

ИНСТИТУТ ПО ФИЗИКОХИМИЯ НА БАН

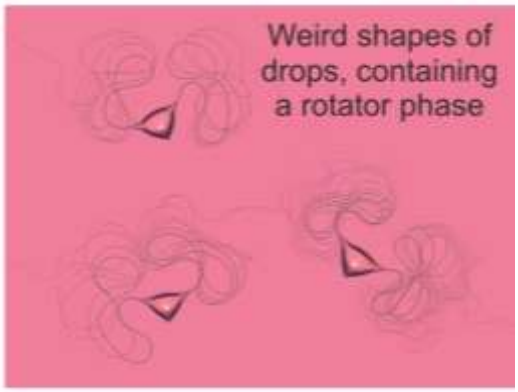
С Ъ О Б Щ Е Н И Е

На **26 февруари 2016 г. (петък) от 11:00 часа в зала “Болцман” на ИФХ-БАН** ще се проведе заседание на Колоквиума със следния дневен ред:

Доклад на **проф. Славка Чолакова** от ФХФ-СУ на тема:

“CONTROL OF DROP SHAPE TRANSFORMATIONS IN COOLED EMULSIONS”

Recently we have performed several related studies[1-3] on the factors controlling the shape transformations in drops upon cooling. Four different types of factors were studied: (1) Type of hydrophobic phase; (2) Type of used surfactant; (3) Cooling rate and (4) Initial drop size. We showed that micrometer sized drops of n-alkane, long-chain alcohols, triglycerides, alkyl cyclohexanes, and linear 1-alkenes, can break symmetry upon cooling and “self-shape” into fluid polyhedra, platelet-shaped hexagons, triangles, rhomboids, squares, toroids, O-shapes, and sub-micron in diameter fibers. Furthermore, we found that this process includes a specific transition, in which a capillary instability leads to formation of very long, sub-micrometer in diameter fibers. This transition is a manifestation of the existence of two intermediate rotator phases, formed in the cooled alkane drops before their freezing. We demonstrated that the main factors which can be used to control the drop “self-shaping”, before their freezing into solid particles, are the surfactant type and chain length, cooling rate, and initial drop size. As a rule, the smaller drops, stabilized by surfactants with longer chain-length, and subject to slower cooling, evolve easier to shapes with higher aspect ratio. The studied surfactants are classified with respect to their effect on the “self-shaping” phenomenon and coherent explanations of the main experimental trends are proposed.



References: [1] N.Denkov, S.Tcholakova, I.Lesov, D.Cholakova, S.Smoukov *Nature* **2015**, *528*, 392-395; [2] D.Cholakova N.Denkov, S.Tcholakova, I.Lesov, S.Smoukov “Control of drop shape transformations in cooled emulsions” *JACS* **2016**, *submitted*; [3] J.Vulkova, S.Tcholakova, D.Cholakova, I.Lesov, N.Denkov, S.Smoukov, Ultra-low energy emulsification by crystal-melt separation in drops undergoing phase transition, *in preparation*