

XXI FMC

XXI Fluid Mechanics Conference

AGH-UST, Krakow, Poland, 15 – 18 June 2014

Book of Abstracts

Editors:

J.S. Szmyd, E. Fornalik-Wajs, M. Jaszczur

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AGH University of Science and Technology Press, Krakow 2014
ISBN 978-83-7464-704-5

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<http://www.WydawnictwoAGH.pl>

STUDY OF SURFACE INTERACTION FORCES IN POLYSTYRENE COLLOIDAL NANOPARTICLES SYSTEMS

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Keywords: *nanoparticles, polystyrene beads, surface properties, atomic force microscopy, hydrodynamic properties*

The paper is dedicated to the study of the forces involved in colloid stability and the relationship between surface and hydrodynamic properties of polystyrene nanoparticles.

Nanotechnology is required in most biological and engineering applications and that have a significant impact in different research fields. Metal and polymer nanoparticles have interesting mechanical, optical, electrical and chemical properties. These materials have been used in many applications, such as catalysis, tissue engineering, drug delivery [1], reinforced materials [2], sensor and device fabrication [3].

The basic characteristic of nanoparticles is the high surface area to volume ratio, the consequence of it is that the nanoparticles properties are strongly affected by the surface modification.

This research used atomic force microscopy (AFM) to understand the interaction forces between polystyrene nanoparticles and cantilever measured in different salt solutions and varying ionic strength [4]. Total interaction force between the polystyrene microsphere and the tip is due to the electric double layer forces and van der Waals interactions sum. The change of repulsive forces at various ionic strengths due to the modification of double layer structure affect the stability and the hydrodynamic properties of colloid systems [5].

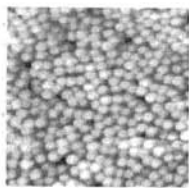


Fig. 1 Polystyrene nanoparticles AFM topography

Fig. 2 Tip–polystyrene nanoparticle interaction forces curve

Project supported by NCN grant no. 2011/03/B/ST8/05481.

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