

## DYNAMIC AMPHIPHOBICITY WITH HEXADECANE AND WATER DROPLETS

I. Malavasi<sup>1</sup>, F. Veronesi<sup>2</sup>, A. Caldarelli<sup>2</sup>, M. Zani<sup>3,4</sup>, M. Raimondo<sup>2</sup>, M. Marengo<sup>1,5</sup>

- 1) Department of Engineering and Applied Science, University of Bergamo, Viale Marconi 5, 24044 Dalmine (BG), Italy. E-mail: ileana.malavasi@unibg.it
- 2) ISTECCNR - Institute of Science and Technology for Ceramics, Via Granarolo 64, 48018 Faenza (RA), Italy
- 3) Department of Physics, Politecnico di Milano, Piazza Leonardo da Vinci 32, 20133 Milano, Italy
- 4) Center for Nano Science and Technology @Polimi, Istituto Italiano di Tecnologia (IIT), Via Giovanni Pascoli 70/3, 20133 Milano, Italy
- 5) University of Brighton, School of Computing, Engineering and Mathematics, Lewes Road, BN2 4GJ, Brighton, UK

Keywords: drop impact, wettability, wetting transitions

Main Topic: wetting and spreading

The normal impact of water and hexadecane liquid drops onto solid and dry surfaces, with different wettabilities, has been studied experimentally using high-speed camera. The wetting behavior of aluminum foils, before and after the deposition of organic-inorganic hybrid coatings, infused hybrid coatings, grafting FAS and grafting fatty acid treatments, has been analyzed and the results compared. Drop impact velocities in the 0-4.1 m/s range have been used. Quasi-static contact angle, roughness, SEM analysis and drop impact test allowed relating the dynamic behavior of the surfaces with their wettability characteristics. The high-speed outcomes of water and hexadecane impacting droplets behavior on all the different kind of surfaces and the temporal evolution of the contact radius of droplets upon impact and retraction are shown. With water, rebound is mostly observed on SHS surfaces. Curiously, in the case of water drop impacting on raw aluminum foils, at  $We \approx 21$ , a deposition occurs with the generation of a secondary drop. In general, up to a speed of 1.5 m/s with hexadecane, deposition always occurs for all surface types, except sometimes in the case of FAS surface. At higher velocity, prompt splash and receding breakup are mainly present. Rebound was never observed with hexadecane even when receding contact angle reaches 110-120°.