

PLN-4

## SYNTHESIS AND SURFACE FUNCTIONALIZATION REACTIONS UNDER LOW- AND ATMOSPHERIC-PRESSURE, NON-EQUILIBRIUM PLASMA ENVIRONMENTS

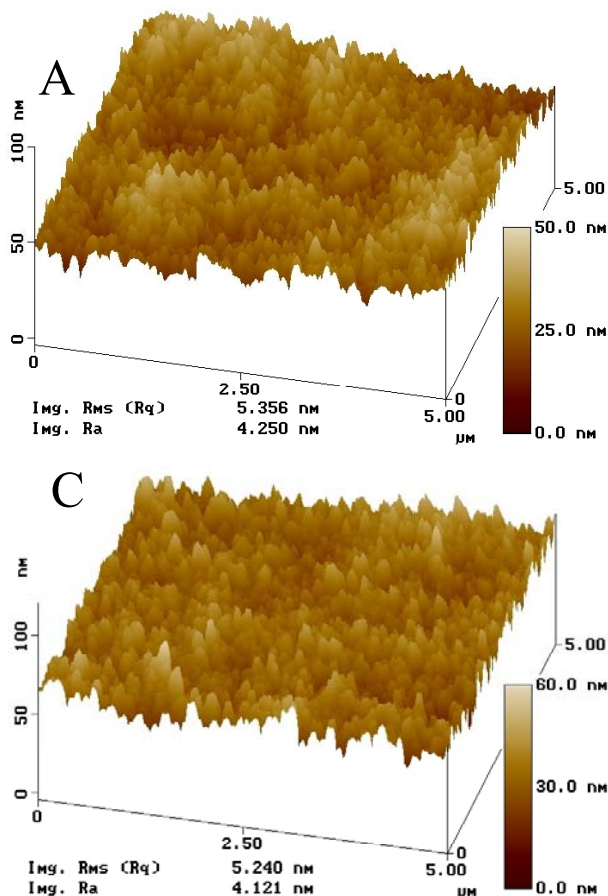
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Implantation under low and atmospheric pressure non-equilibrium plasma conditions of  $\text{SiCl}_x$ ,  $\text{NH}_2$ ,  $\text{COOH}$  and  $\text{CH=O}$  functionalities onto inorganic and organic polymeric substrates will be presented and the immobilization of active biomolecules, such as enzymes, in the presence and absence of spacer-chain molecules (Figure 1), will be discussed.

Original, atmospheric pressure (non-equilibrium) plasma installations, including the Dense Medium Plasma Reactor (DMP), Array Electrode Reactor (AER), Capillary Reactor (CR) – Figure 2 - and Flat Plasma Reactor (FPR) will be presented and surface functionalization and synthesis processes, involving the novel



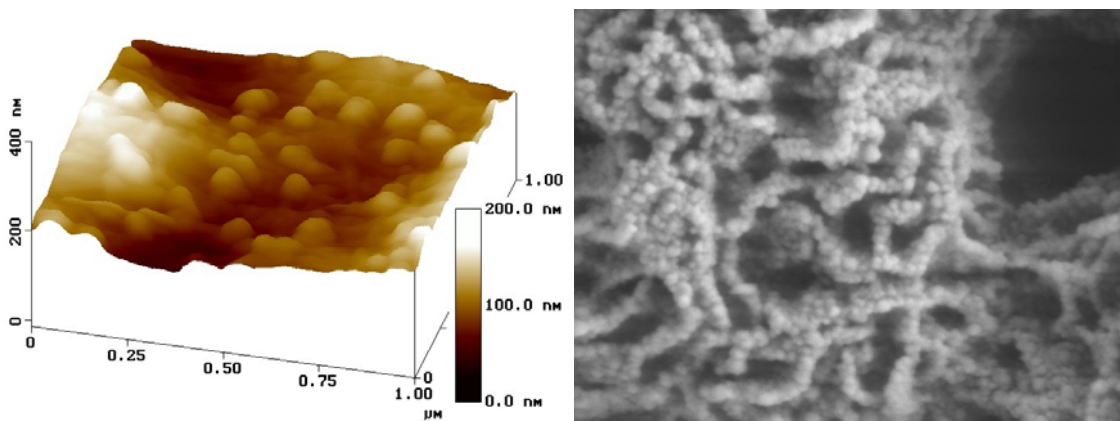
**Figure 1.** 3D AFM images of 13.56 MHz hydrazine-plasma treated cellophane bearing one step (A) and four steps (C) spacer chains and the immobilized

plasma tools, will be evaluated.



**Figure 2.** Atmospheric plasma reactors: AER (left) and CP (right).

Deposition of macromolecular structures including anti-fouling-, super-hydrophobic-, and thin silver-layers (Figure 3) will be presented and the synthesis of nanoparticle systems, and plasma-enhanced disinfection and decontamination processes will be discussed.



**Figure 3.** Silver nano-particles deposited on polyethylene (AFM image; left) and polyamide fibers (SEM image, magnification X100,000; right).