Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Physical properties of poly(lactic-co-glycolic) and poly(ethylene glycol) nanoparticles for drug delivery using atomic force microscopy (AFM) and electrostatic nanolithography SERGEI LYUKSYUTOV, IGOR FEDIN, VICTORIA NEDASHKIVSKA, Department of Physics, University of Akron, Akron OH, CATERINA LYUKSYUTOVA, St Vincent St Mary High School, Akron OH, WERNER GELDENHUYS, VIJAY SUTARIYA, Department of Pharmaceutical Sciences, Northeastern Ohio Universities Colleges of Medicine and Pharmacy, Rootstown OH — Nanoparticles (NP) of biodegradable polymers poly(lactic-co-glycolic)(PLGA) and poly(ethylene glycol) (PEG) are potential drug delivery components for biomedical applications. The NP based on PLGA or PEG can be directed to accumulate in cancer tumor cells with the use of anti-bodies which are conjugated to the NP. The NP's size distribution is the critical property for biochemical affinity and therefore delivery to the specific target organs. We used an atomic force microscopy (AFM) to characterize the NP size and AFM electrostatic nanolithography (AFMEN) to study the behavior of PEG-PLGA NP under the extreme electric fields exceeding 10^9 V m^{-1}. AFMEN allows the displacement of molecules along the lines of the electric field due to electrostatic polarization. This study has an important practical application for the optimum design of NP with the correct characteristics for drug delivery.

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Date submitted: 02 Dec 2009 Electronic form version 1.4