

Abstract Submitted
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Nanoparticle size and shape characterization with Solid State Nanopores SANTOSHI NANDIVADA, MOURAD BENAMARA, JIALI LI, University of Arkansas — Solid State Nanopores are widely used in a variety of single molecule studies including DNA and biomolecule detection based on the principle of Resistive Pulse technique. This technique is based on electrophoretically driving charged particles through 35-60 nm solid state nanopores. The translocation of these particles produces current blockage events that provide an insight to the properties of the translocation particles and the nanopore. In this work we study the current blockage events produced by ~ 30 nm negatively charged PS nanoparticles through Silicon Nitride solid state nanopores. We show how the current blockage amplitudes and durations are related to the ratio of the volume of the particle to the volume of the pore, the shape of the particle, charge of the particle and the nanopore surface, salt concentration, solution pH, and applied voltage. The solid-state nanopores are fabricated by a combination of Focus Ion Beam and low energy Ion beams in silicon nitride membranes. High resolution TEM is used to measure the 3D geometry of the nanopores and a finite element analysis program (COMSOL) is used to simulate the experimental results.

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