

FASTAB™ TECHNOLOGY

Sensing DNA-coatings of microparticles using micropipettes

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Résumé / Abstract

The resistive pulse technique is widely used to detect the size of small particles in aqueous solutions. This work demonstrates that a few tens of DNA molecules and thus the charges on a particle can be simply detected by pressure-driven translocation through a microcapillary based Coulter counter. The typical opening of the capillaries ranges from 2 to 6 µm. The custom-built system gives optical access using a high numerical aperture objective allowing to observe colloids passing the sensing volume by optical means. We show the feasibility of our setup by distinguishing colloids with one and two micron diameters. Our measurements prove that a few ten strands of DNA bound to the colloids can be detected. This can be achieved by simple comparison of current amplitudes for blank and coated colloids at low salt concentrations (2-40 mmol [NaCl]). Our results clearly demonstrate that the Coulter counter can be used to detect the surface charges on colloids. Moreover, the results are in good agreement with a dynamical computer model taking into account the full geometry of the capillary.

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