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Micropipette as Coulter counter for submicron particles[1]
YAUHENI RUDZEVICH, TONY ORDONEZ, GRANT EVANS, LEE CHOW, University of Central Florida — Coulter counter based on micropipette has been around for several decades. Typical commercial Coulter counter has a pore size of 20 μm, and is designed to detect micron-size blood cells. In recent years, there are a lot of interests in using nanometer pore size Coulter counter to detect single molecule and to sequence DNA. Here we describe a simple nanoparticle counter based on pulled micropipettes with a diameter of 50 – 500 nm. Borosilicate micropipettes with an initial outer diameter of 1.00 mm and inner diameter of 0.5 mm are used. After pulling, the micropipettes are fire polished and ultrasound cleaned. Chlorinated Ag/AgCl electrodes and 0.1 M of KCl solution are used. The ionic currents are measured using an Axopatch 200B amplifier in the voltage-clamp mode. Several types and sizes of nanoparticles are measured, including plain silica and polystyrene nanospheres. The results will be discussed in terms of pH values of the solution and concentrations of the nanoparticles.

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