Electronic Supplementary Material (ESI) for Analyst.

Sensing with nanopores - The influence of asymmetric blocking on electrochemical redox cycling current

Kay J. Krause, Enno Kätelhön, Serge Lemay, Richard Compton, and Bernhard Wolfrum

Supporting Material 1

Detailed parameter tables for all simulations.

- Figure 2/ 3

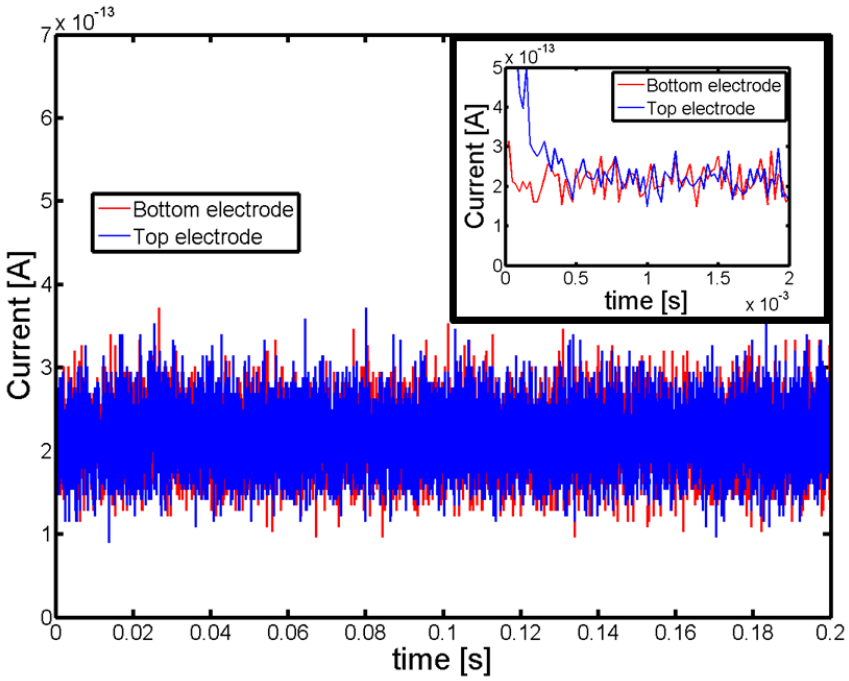
Number of active molecules	1500
Spatial step width	1 nm
Diffusion constant	$6.7*10^{-9}$
Temporal step width	0.75 ns
Number of iterations	$1.34*10^{8}$
Simulated time interval	0.1 s
Sum over iterations	$2.68*10^{5}$
Sampling frequency	5 kHz
Number of traces averaged	10

- Figure 5/ 6

Number of active molecules	1200
Spatial step width	1 nm
Diffusion constant	$6.7*10^{-9}$
Temporal step width	0.75 ns
Number of iterations	$2.68*10^{8}$
Simulated time interval	0.2 s
Sum over iterations	$3.35*10^{4}$
Sampling frequency	40 kHz
Number of traces averaged	50

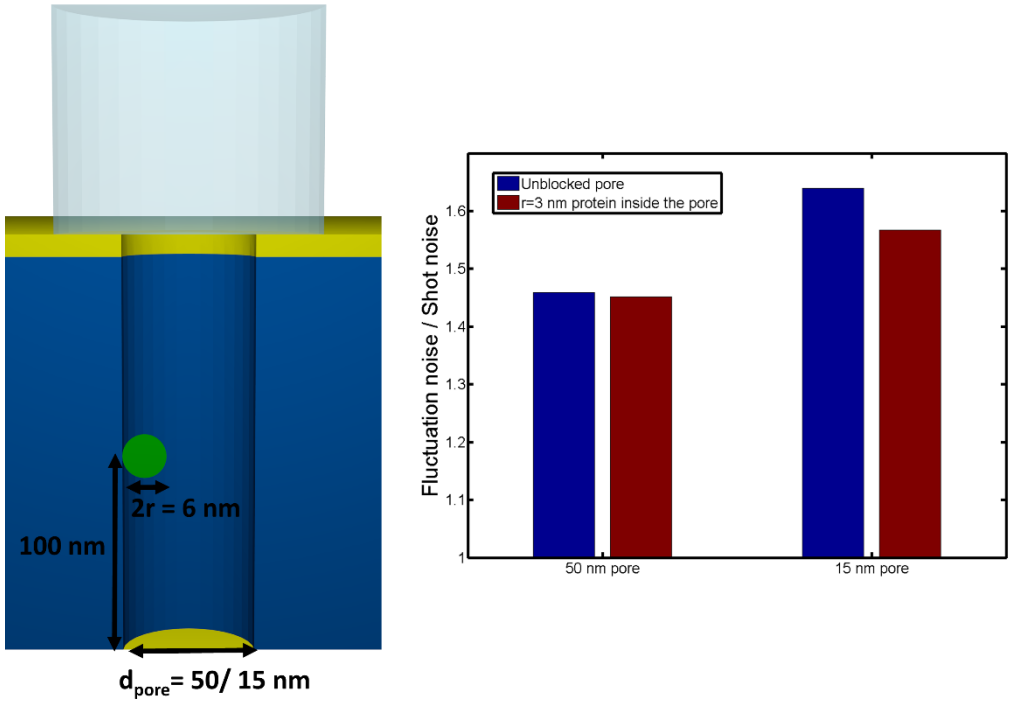
Supporting Material 2

The absolute values of the current traces for both electrodes of an unblocked nanopore. The red curve shows the current occurring at the bottom electrode, the parameters are equal to the one used for the simulation of the current traces for figure 5/ 6. The blue curve shows the current for the top electrode. It can be seen, that within one millisecond the steady state is reached and both currents are in close agreement.



Supporting Material 3

The ratio of the absolute values of the fluctuation and shot noise plateaus simulated for blocking of a single spherical particle with a radius of 3 nm using pore diameters of 50 nm and 15 nm.



The parameters for the 50 nm pore are the same as mentioned in supporting material 1, 10 traces were averaged. For the 15 nm pore the following parameters were used:

Number of active molecules	1200
Spatial step width	0.5 nm
Diffusion constant	$6.7*10^{-9}$
Temporal step width	0.19 ns
Number of iterations	$5.36*10^{8}$
Simulated time interval	0.1 s
Sum over iterations	$3.35*10^{4}$
Sampling frequency	160 kHz
Number of traces averaged	3