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Rectified polymer translocation induced by solvent assymetry between *cis* and *trans* compartments CHRISTOPHER LORSCHER, ANIKET BHATTACHARYA, University of Central Florida, TAPIO ALA-NISSILA, Helsinki University of Technology — We report Langevin dynamics simulation studies of translocation of a homopolymer through a nano pore driven by different solvent conditions at either side of the pore. The solvent at the *cis* compartment is modeled as a "*good solvent*" while the solvent at the *trans* side is modeled as a "*bad solvent*" so that the translocated beads of the polymer conforms to a globule and inhibits back translocation from the *trans* to the *cis* side. Therefore, the translocating polymer acts like a *Brownian Ratchet*. We study the translocation as a function of the dimensionless quantity ϵ/k_BT, where ϵ is the strength of the attractive interaction at the *cis* side, k_B is the Boltzmann constant, and T is the temperature respectively for several chain length N. We find that as N gets larger the mean translocation time $\langle\tau\rangle \sim N$ and shows a rather weak dependence on the parameter ϵ/k_BT . This is consistent with the observation that excepting for the last few monomers, the velocity of the individual monomer s $v(m)$ is roughly constant being independent of the monomer index m. We further discuss a plausible physical picture leading to such chain length dependence.

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