Dynamics of polymer translocation rectified by attractive binding particles ANIKET BHATTACHARYA, CHRISTOPHER LORSCHER, University of Central Florida, TAPIO ALA-NISSILA, Helsinki University of Technology, WOKYUNG SUNG, Pohang University of Science and Technology — We study translocation of flexible homopolymer chains through a nanopore in presence of attractive particles those bind reversibly on the trans part of the chain and responsible for successful translocation using Langevin dynamics simulation. We study the mean first passage time (MFPT) as a function of the density $\rho_{\text{att}}$ and strength $\epsilon_{\text{att}}$ of the attractive particles respectively and find that it is qualitatively different compared to the results obtained for straight(rigid) chains. Further, we find the average translocation time $\langle \tau \rangle \sim N^{1.5}$ which is faster than the lower bound predicted by simple one dimensional Langevin equation. Finally, we find that for certain combination of $\rho_{\text{att}}$ and $\epsilon_{\text{att}}$ the translocation is most efficient. We interpret it as a resonant assisted activated translocation. We discuss relevance of our studies in biological translocation processes.


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