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Nanopore Translocation Dynamics of star polymers[1] RONG WANG, ZHU LIU, Nanjing University, Department of Polymer Science and Engineering, State Key Laboratoryof Coordination Chemistry — The translocation of polymers through a narrow channel or a nanopore has a significant impact on numerous biological systems and industrial process, examples including rapid DNA sequencing, controlling drug delivery, and designing nanopore sequencing device.We consider the dynamics of flow-induced translocation of star polymers through a nanopore in three dimensions by dissipative particle dynamics approach, focusing on the dependence of the translocation time on the polymer chain length. The scaling of the average translocation time τ *vs.* the total length $N_{\rm tot}$ of the star polymer with three arms, $\tau \sim N_{\rm tot}^{1.09\pm0.04}$, is obtained in our simulation. We establish that the overall translocation time, with the translocation probability $P_i^{\rm trans}$ and the translocation time τ_i under different translocation paths. We demonstrate that the translocation time τ of star polymers through the nanopore increases with the increase of the total arm numbers, while τ decreases with increasing number the forward arms that are initially squeezed into the nanopore. Our findings may provide a valuable guidance for experimental studies on the conformational and dynamics behaviors of star polymer translocation for further applications.

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