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Universal function for the diffusion coefficient of DNA fragment JEAN-FRANCOIS MERCIER[1], GARY W. SLTATER, University of Ottawa — The separation of DNA fragments by (gel or capillary) electrophoresis has been studied extensively. To characterize the separation achieved by such systems, one needs to understand the impact (and their dependency upon the experimental quantities) of two physical parameters: the electrophoresis mobility μ and the diffusion coefficient D. Three different regimes have been shown to exist for both μ and D: the Ogston regime, the reptation regime and the reptation-with orientation regime (note that separation is only possible for the first two regimes). Both μ and D are well described by theory for all three regimes. Unfortunatly this results in disjointed scaling regimes and no theory-based general equations can apply to all regimes. Recently, an empirical formula has been proposed that adequately fit the mobility μ of dsDNA fragments across all three regimes and is compatible with accepted theories. In this work we propose a similar formula for the diffusion coefficent D. With those two formulas, one could optimize any separation system quite easily for a wide range of DNA molecular sizes.

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