Suspensions of arbitrary-shaped particles - Brownian contribution to intrinsic viscosity

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In physical chemistry, dynamic light scattering and viscosity measurements can provide information about structure of particles (such as e.g. fibrinogen) in colloidal suspensions [1]. Indeed, both self-diffusion and viscosity coefficients are sensitive to a change of particle shape. For suspensions of arbitrary-shaped particles, the single-particle short-time self-diffusion coefficient and the high-frequency intrinsic viscosity can be easily derived from the existing theoretical framework, e.g. with the use of the bead model, and the multipole expansion of the Stokes equations [2]. However, as far as we know, the Brownian contributon to the intrinsic viscosity has been determined only for special types of shapes, such as axially symmetric particles [3]. In this work, we theoretically derive general expressions for the Brownian contribution to the intrinsic viscosity of arbitrary-shaped particles.

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