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Effective static and high-frequency viscosities of concentrated suspensions of soft particles CARLOS I. MENDOZA, Instituto de Investigaciones en Materiales, UNAM — We obtain an analytic expression that allows determining the static and high-frequency viscosities as function of the volume fraction of a concentrated suspension of soft spherical particles. The particles consist of a hard core of radius a covered by a porous layer of thickness d. The proposed expression incorporates the results for the intrinsic viscosity obtained on the basis of a cell model into a recently obtained relation for the effective viscosity of concentrated colloidal suspensions [J. Chem. Phys. 130, 044904 (2009)]. In this model, the correlations between the particles due to crowding effects are introduced through an effective volume fraction which is then used as integration variable in a differential effective medium procedure. The final expression is simple, accurate, and allows collapsing all the data in a universal master curve. The only difference between the static and high-frequency cases is that in the last case the effective volume fraction also incorporates hydrodynamic interactions arising from the so-called relaxation term. We have tested the accuracy of our model with experiments and simulations. In all cases the agreement with the data is extremely good.

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