



PASSIVE MICRORHEOLOGY : NON INTRUSIVE MEASUREMENT TO FOLLOW VISCOELASTIC EVOLUTION AND CONCENTRATION EFFECTS

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This work presents a new technique of the passive microrheology for the study of the microstructure properties of soft materials. Our technology uses Multi Speckle DWS (MS-DWS) set-up in backscattering with a video camera. It allows to measure the mean displacement of the microstructure particles in a spatial range between 0,1 and 100 nm and a time scale between 10⁻¹ and 10⁵ seconds. Different parameters can be measured or obtained directly from the Mean Square Displacement (MSD) curve like a fluidity index, an elasticity factor, a viscosity factor, a relaxation time, a MSD slope... Also when the particles move only thanks to the Brownian motion, the Generalised Stokes Einstein Relation given by Mason and Weitz can be applied to calculate the visco-elastic moduli G' and G'' over a large frequency range. This technique allows to monitor the evolution of the microstructure, the restructuration after shearing, the variation of the viscoelastic properties versus temperature, pH, the physical stability of emulsion or suspension... This work focuses on viscoelastic properties measurement of polymers versus molecular weight, concentration or salt concentration. This study will show examples and advantages of using a non intrusive method.