INTRODUCTION

Silica particles dispersed in polar solvents of low molecular weight form non-flocculated suspensions [1, 2]. When highly concentrated, these suspensions present discontinuous shear thickening properties and dilate during the viscosity increase [3–5]. At a given level of stress and above a critical shear rate, the viscosity of these fluids increases by several orders of magnitude. This shear thickening phenomenon is instantaneous and reversible. It has been widely investigated in terms of rheological properties [6–10] and many promising applications have been proposed. They all rely on the large energy absorp-
size. It is thus necessary to introduce a strict protocol for STF manufacturing and conservation. Sonication is the fastest way to disperse the particles inside the STF for rheological tests. Furthermore, unlike with mechanical mixing, there is no risk to induce shear thickening during processing using sonication. The dispersion of the particles inside the fluid is then maintained by the presence of the electrostatic and Brownian forces. In contact with air and humidity the shear thickening properties deteriorate over time. Two different solutions to preserve the rheological properties are thus proposed storage at temperature under -24° C and encapsulation inside a material with good barrier properties to water and air. The encapsulation of the STF inside a containing material seems the most efficient way to preserve its rheological properties, because it also provides a “solid framework” to the STF that facilitates its integration for a damping application.

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