

# Storage modulus thixotropy

Do the orthogonal moduli show a thixotropic recovery without applied shear?

Without applied shear, the orthogonal moduli only show a thixotropic recovery, increasing monotonically to their respective steady state values, and the storage modulus is much larger than the loss modulus during the cessation.

Does transient shear stress affect thixotropic decay?

It should be noted that a steady state was never observed for the transient shear stress, or the orthogonal storage and loss moduli of all suspensions even after 20 minutes of shearing, once they begin to show anti-thixotropic decay.

Does thixotropic structure change under low shear?

The change in both the elastic moduli and their ratio suggests that along with the thixotropic structure build-up and anti-thixotropic decay, the anisotropic structure in CB suspensions under low shear keeps evolving and increasing over these timescales. FIG. 15.

Why are transient dynamics dominated by thixotropy?

The transient dynamics of CB suspensions are dominated by thixotropy, because the CB structure build-up and break-down processes mentioned earlier happen over timescales typically longer than the viscoelastic relaxation time [36,38].

What is the hysteresis loop for thixotropic materials?

The direction of the hysteresis loop for thixotropic materials is clockwise, while for anti-thixotropic and viscoelastic materials, they are counter-clockwise.

Does setting affect thixotropic recovery?

An increase in wait time allowed for more thixotropic recovery to occur, based on the increase in the thixotropic loop, but the influence of setting increased the total stress maximum during shear rate ramping. It was also found that a critical shear rate of  $100 \text{ s}^{-1}$  was necessary to cause any sort of physical network disruption.

Yield stress, plastic viscosity, storage modulus, and short-term thixotropy are found to be significantly higher (up to 2 times or more for yield stress, plastic viscosity, and storage modulus, and up to 3 ...

In this paper, the rheological properties of lithium lubricating grease, such as apparent viscosity, yield stress, thixotropy, storage modulus and loss modulus, were studied based on the practical conditions ...

The yield stress defines the shear stress required to induce/stop plastic flow in concrete while thixotropy refers to the reversible evolution of the yield stress over time [21]. The storage ...

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The viscoelastic properties obtained are  $G^*$  (complex modulus), storage (or elastic) modulus ( $G'$ ), loss (viscous) modulus ( $G''$ ), and complex viscosity ( $\eta^*$ ).  $G'$  is a parameter that ...

For viscoelastic characterization, the storage modulus and loss modulus were measured at stresses of 0.2 to 200 Pa and at a frequency 1 Hz. The modulus measurements were ...

By analyzing and calculating the relationship curve between the storage modulus and time, the ability of the gel to recover the three-dimensional network structure after shear damage can ...

The evolution of static yield stress and storage modulus can be used to evaluate the structural build-up of fresh cementitious materials, each describing different aspects.

This can be done by splitting  $G^*$  (the "complex" modulus) into two components, plus a useful third value:  $G' = G^* \cos(\delta)$  - this is the "storage" or "elastic" modulus

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The storage modulus  $G'$  represents the elastic or in-phase response and the loss modulus  $G''$  represents the viscous or out-of-phase response. They are related to the viscoelastic ...

The storage modulus refers to the structural stiffness (early elasticity) of concrete, while rigidification causes an increase in the storage modulus. Both thixotropy and rigidification, referred to as ...

The concentrated suspensions produced a lower rate of increase in the critical storage modulus (smaller thixotropy ratio) than the diluted suspensions with time; similarly, larger percentages of SPP induced ...

Fig. 6 (a-d) depicts the thixotropy of the ink formulations containing Triton X-100 as a rheological modifier, and as the amount of Triton X-100 increases in the ink and the holding time, the ...

Thixotropy evaluation by oscillatory shear measurements This section covers oscillatory shear measurement parameters such as storage modulus ( $G'$ ) and loss modulus ( $G''$ ) for ...

By applying a continuous sinusoidal shear strain within the linear visco-elastic region (LVER), the responses of the material such as storage modulus ( $G'$ ), loss modulus ( $G''$ ) and phase angle ( $\delta$ ) can ...

Important rheological properties for a prospective DIW ink include prominent shear thinning behavior, a

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rapid, complete, and consistent storage modulus recovery during a three-interval ...

storage (or elastic) modulus,  $G''$  is dominant over the entire frequency range. The system is gelled, showing little change in viscoelastic characteristics. Sample 2, on the other hand, is frequency ...

Abstract A large amplitude oscillatory shear (LAOS) is considered in the strain-controlled regime, and the interrelation between the Fourier transform and the stress decomposition approaches is ...

All samples exhibited typical thixotropic yield stress behavior, with Welan gum-containing yogurts demonstrating enhanced viscosity, storage modulus, thixotropy, and yield stress, ...

There is a sharp increase at degrees of polymerization higher than 1300. However, the storage modulus of PVA-24 is lower than that of PVA-17 and PVA-20 at low shear rate ( $<1$  rad/s). The viscoelastic ...

Conte et al. [21] found that the addition of rod-like attapulgite significantly improved yield stress, storage modulus, and thixotropy, even at low levels. Santos et al. [20] indicated that an ...

In effect, the CNF suspensions at these concentrations have a network structure where the storage modulus is an increasing function of solid content. An important rheological property of ...

In addition, a consistent crossover between the storage and loss modulus within 1-3 min of oscillation during cyclical oscillatory measurements ...

We also reveal how this long-time stress decay is associated with anti-thixotropy, rather than viscoelasticity, by using orthogonal superposition (OSP) rheometry to probe viscoelastic ...

Overall, both hydrogels demonstrate shear-thinning abilities and a change in loss and storage modulus at different strain; however, the 5% hydrogel has overall ...

The thixotropic build-up has been reported on CB suspensions, quantified by an increased storage modulus, where the value of the storage modulus depends on the applied shear stress before ...

In this paper, the rheological properties of lithium lubricating grease, such as apparent viscosity, yield stress, thixotropy, storage modulus and loss modulus, were studied based on the ...

Notably, a bicontinuous structure achieved with an OG to HG ratio of 1:1 (sample 1-1) imparted desirable properties for 3D printing, including moderate shear-thinning behavior, ensuring smooth extrusion, ...

The instantaneous shear modulus is calculated from the above Vane test result at  $0.005 \text{ s}^{-1}$  by dividing the measured shear stress by the shear strain whereas the shear storage modulus  $G'$  ...

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At 15% UF resin, the gel demonstrates optimal performance with a storage modulus of 62.4 Pa and a loss modulus of 6.3 Pa, meeting the ...

Finally, the strain was restored to its original smaller value (0.1%), and the change in the storage modulus with time before and after the thixotropic recovery was observed. At the same time, ...

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