

THE SIGNIFICANCE OF THE SIZE OF THE DYNAMIC STORAGE MODULUS



What is the difference between storage modulus and dynamic loss modulus? The storage modulus is often times associated with ???stiffness??? of a material and is related to the Young's modulus, E . The dynamic loss modulus is often associated with ???internal friction??? and is sensitive to different kinds of molecular motions, relaxation processes, transitions, morphology and other structural heterogeneities.



What is storage modulus? The storage modulus, either E' or G' , is the measure of the sample's elastic behavior. The ratio of the loss to the storage is the tan delta and is often called damping. It is a measure of the energy dissipation of a material. Figure 2.



What is storage modulus in tensile testing? Some energy was therefore lost. The slope of the loading curve, analogous to Young's modulus in a tensile testing experiment, is called the storage modulus, E' . The storage modulus is a measure of how much energy must be put into the sample in order to distort it.



Why is dynamic loss modulus important? The dynamic loss modulus is often associated with ???internal friction??? and is sensitive to different kinds of molecular motions, relaxation processes, transitions, morphology and other structural heterogeneities. Thus, the dynamic properties provide information at the molecular level to understanding the polymer mechanical behavior.



How do you calculate a complex modulus from a dynamic mechanical test? $s = s_0 \sin(\omega t) \cos \delta + s_0 \cos(\omega t) \sin \delta$. Equation (7) shows that the complex modulus obtained from a dynamic mechanical test consists of ???real??? and ???imaginary??? parts. The real (storage) part describes the ability of the material to store potential energy and release it upon deformation.

THE SIGNIFICANCE OF THE SIZE OF THE DYNAMIC STORAGE MODULUS



What is a dynamic modulus of a polymer? These properties may be expressed in terms of a dynamic modulus, a dynamic loss modulus, and a mechanical damping term. Typical values of dynamic moduli for polymers range from 10^6 - 10^{12} dyne/cm² depending upon the type of polymer, temperature, and frequency.



As a bridge for static and dynamic modulus conversion, this method greatly expands the expression ability of the relaxation modulus and dynamic storage modulus on the mechanical properties of the



storage modulus, ???, , ? 1/4 ?



The physical meaning of the storage modulus, G' and the loss modulus, G'' is visualized in Figures 3 and 4. The specimen deforms reversibly and rebounds so that a significant of energy is recovered (G''), while the other fraction is ???



The contributions are not just straight addition, but vector contributions, the angle between the complex modulus and the storage modulus is known as the "phase angle". If it's close to zero it means that most of the overall complex modulus is due to an elastic contribution.

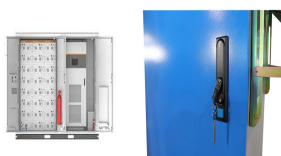
THE SIGNIFICANCE OF THE SIZE OF THE DYNAMIC STORAGE MODULUS



Amplitude sweep test results illustrating the variation of the dynamic storage modulus (G'') and loss modulus (G''') with shear strain (γ) for (a) neat emulsions with different refining times (t)



Introduction. Thermoplastic and thermoset solids are routinely tested using Dynamic Mechanical Analysis or DMA to obtain accurate measurements of such as the glass transition temperature (T_g), modulus (G'') and damping ($\tan \delta$). ???



???? 1/4 ????? ??? " " "???, , ???



Dynamic mechanical testers apply a small sinusoidal stress or strain to a small sample of the polymer to be examined and measure resonant frequency and damping versus temperature and forced frequency. Instrument software ???



(Storage Modulus) E'' , ?????? E'' , ? 1/4 ?7. ???

THE SIGNIFICANCE OF THE SIZE OF THE DYNAMIC STORAGE MODULUS



Recommendations were initially provided for a conservative dynamic subgrade modulus based on historical and presumptive values for rock. Later in the design phase, recommendations were revised to take advantage of the recent nearby ???