Storage modulus and cross-linking

Does cross linking increase the storage modulus?
Cross linking increases the interconnection between different long back bone chains,leading to an increase in the elastic energy (stress applied and strain) or storage modulus of the polymer. Cross linking brings about a decrease in chain mobility.

Do crosslinkers with different molecular weights give higher modulus?
Chowdhury et al. . cross-linked epoxy resins using crosslinkers with different molecular weights and found that lower molecular weight crosslinker would impart higher modulusto the material. However,the situation changed when cross-linking bonds of different lengths were mixed.

What drives the modulus of an uncrosslinked material?
In an uncrosslinked material,especially elastomers,the modulus is driven by the difficulty of chains to flow past one another due to entanglements [think noodles]. Crosslinks form a more rigid,non-flowing bulk compared to entanglements.

What is the storage modulus?
In dynamic tests,the storage modulusis a measure of the energy recovered when a certain strain is oscillated in a sample. The tests involve measuring the energy lost (heat,loss modulus E'') and the energy recovered (elastic recovery,storage modulus E'). A high storage modulus signifies that more energy will be recovered.

What is the storage modulus of cross-linked gels?
The storage modulus of cross-linked gels were determined via a DHR-1 rheometer (TA Instrument, USA), equipped with a parallel plate geometry (40 mm diameter and 1 mm gap) at 25 °C.

Does crosslinking density affect thermo-mechanical properties of plant oil-based epoxy resins?
Previous studies suggested that the crosslinking density had a considerable influence on the mechanical and thermal properties of plant oil-based epoxy resins. However,so far,the relationship between the crosslinking density and the thermo-mechanical properties of plant oil-based epoxy resins is not clear.

In addition, the cross-linking structures of CNTs and NR also help to improve the storage modulus of the filled rubber and weaken the Payne effect of the filled rubber, which can be attributed to ...

The crosslinking densities of the cured tung oil-based epoxy resins are calculated from the storage modulus-temperature curves according to eqn (1) and ...

Thus, storage modulus, which related to the elements that comprise the structure and their mutual interactions, was different when gels were induced by different cross-linking ...

Higher concentrations of reinforcing agents tend to improve stiffness, resulting in elevated storage modulus values, while the introduction of plasticizers can increase chain ...

Determination of the cross-linking density of the hydrogels The elastic modulus of the hydrogels was determined from the strain-stress curves obtained by the compression tests ...

This is because the benzopyran ring contained in DEP and LEP can undergo cycloaddition, introducing extra cross-linking points, resulting in a dramatically increase in the ...

Recently, strengthening effects of a sequential cross-linking procedure, whereby GM hydrogel precursor solutions are cooled before chemical cross-linking, were reported.

The viscoelastic properties of polymers such as the storage modulus, the loss modulus, and the loss tangent show a positive exponential relation with the apparent cross-link ...

Tough and stretchable hydrogels can be prepared by free radical polymerization with a high monomer concentration and low cross-linker content to optimize the balance ...

Finally cross-link density calculated from the values of specific volume of polymer and Molecular weight between cross-link (for more details you can contact me ...

16. Kato K, Ikeda Y, Ito K. Direct determination of cross-link density and its correlation with the elastic modulus of a gel with slidable cross-links. ACS Macro Lett 2019; 8: 700-704.

The storage modulus of DAG-PU-3 was higher than that of DAG-PU-1 and DAG-PU-2, indicative of the stiffness of networks with higher cross-linking density. The microphase ...

The flame retardant vitrimer also exhibits a storage modulus of 1.2 GPa at 50 °C and a Tg (tan? peak) of 185 °C, which are comparable to the values found with conventional ...

The storage modulus G ? increased with increasing temperature and cross-linking density irrespectively of the cross-linking agent resulting from a stiffening and ...

Storage and loss modulus measured during cross-linking. The increase of the storage modulus indicates that the bioink is cross-linked. The arrow indicates ...

This design gives insight that the trade-off between creep and mechanical strength can be solved by dividing the network into two phases with different cross-linking ...

We investigated physical and chemical cross-linking of three different GM (A) derivatives (GM10, GM2A8 and GM2), which provided systematically varied ratios of side ...

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The mechanical properties of silicone rubbers can be regulated by designing the cross-link density and cross-linking structure, and altering the molar contents of vinyl in the ...

The optical clear pressure-sensitive adhesive, crosslinked by three flexible crosslinkers, exhibits a low glass transition temperature (-60 to -40°C) and a low storage modulus (<0.1 MPa), along ...

Additionally, the alkyl imidazolium cations with multiple functional groups increased cross-link density, storage modulus, and thermal stability in the cured epoxy ...

Crosslinking always enhances the storage modulus. Nanoindentation is the right technique to identify changes in storage modulus due to changes in cross-linking.