Mathematical relationship between storage modulus and temperature

How does temperature affect storage modulus?
The storage modulus generally increases with increase in the percentage of secondary constituent (polymer as blend,fillers/reinforcement to make composite),while it decreases dramaticallywith increase in temperature,and a complete loss of properties is observed at the Tg,which is generally close to 40 °C.

What is a storage modulus?
The storage modulus is a measure of how much energy must be put into the sample in order to distort it. The difference between the loading and unloading curves is called the loss modulus,E ". It measures energy lost during that cycling strain. Why would energy be lost in this experiment? In a polymer,it has to do chiefly with chain flow.

How does loss modulus affect storage modulus?
Clearly,as chains begin to move more freely,loss modulus increases. Consequently,the material also becomes less stiff and more rubbery. The storage modulus drops. If tan delta is the ratio of loss modulus to storage modulus,it should increase at that point -- and it does.

What is the relationship between temperature-dependent elastic modulus and melting point?
The inherent relationships between temperature-dependent elastic modulus, coefficient of expansion, heat capacity (or Debye temperature), and melting point of metallic materials are uncovered by the model.

What is the storage modulus of a polymer?
In the glassy region the storage modulus,E?,is about the same for all amorphous,unpigmented network polymers (approximately 2 to 4 × 10 10 dynes/cm 2which is equal to 2 to 4 × 10 9 Newtons/m 2). E' drops sharply in the transition region. For uncrosslinked,high molecular weight polymers,E' drops by more than three orders of magnitude.

How does frequency affect storage modulus?
The results would typically be presented in a graph like this one: What the graph tells us is that frequency clearly matters. When the experiment is run at higher frequencies,the storage modulus is higher. The material appears to be stiffer.

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