Q&A Group 15.07.2020

In this section, all your questions have been categorized to be answered more efficiently.

Categories

- **Time Temperature Superposition, TTS.**
- **About the paper (Miscellaneous)**
- **Activation Energy**
- **Others**

Time Temperature Superposition, TTS.

- TTS is only applicable to visco-elastic materials right?- Some rheomertes have an included software to calculate the master curve?-*Constanza Álvarez López. It can be used for other regions, and yes the rheometers have a software to do that so technicians run thhe samples and give information to the researchers*
- Is there any software that can be used to effectively construct the master curve? can Rheoplus be used?-*Seyedehniousha Mousavi don´t know about Rheoplus but Trios do have it. (The sofisticated TA and before Rheometrics have it)*
- In the paper used antioxidants, can affect the rheological measurement, and for that affect the Master Curve? *José Iván Avilés Castrillo Typically the amounts of antioxidants is very small but f you don´t have it the polymer might decompose whle is tested*
- Assuming, just assuming, I have different polymers but with same molecular weight and melt temperature, does every polymer will have different Master Curves? *Diego Sebastián Ceciliano Franco. Yes, they might be different*
- In all the Master Curves of every polymer, is there a point of coincidance? If is, what does it mean? Is like the triple point? *Diego Sebastián Ceciliano Franco I don´t understand your question*

Time Temperature Superposition, TTS.

- For the shift factor is necessary to determine the melt density as a function of temperature of every material that we use or is there any standard data to determine its magnitude? -*Katya Michelle Aguilar Pérez* *If you follow the paper by Mavridis , you don´t need to make the adjustment for density*
- How the Power law exponent is related to elongational viscosity? *Katya Michelle Aguilar Pérez*The value of n is used in the expresion for the elongational viscosity
- Is still valid to build the master curve by shifting data, if the material undergoes changes in its internal structure with temperature? (such as crystallization)-*Antonio Osamu Katagiri Tanaka* *The information can tell you that some changes are ocurrng and then the shift factor is not usseful in that region.*
- It's still a little bit obscure for me how to obtain the horizontal and vertical activation energies, How can we know if a polymer presents thermorheological simplicity to apply the TTS-*Jesús Alberto Martínez Espinosa* *The simplicity is when a polymer does not need the vertical shift factor and folloew either the WLF or the Arrhenius type of equation*
- For the TTS is said that the selection of the parameters require a careful selection, is there a methodology for selecting them? I don't know where does the temperature given takes action in the formulas. I got confused how to implement it correctly-*Bryan Iván Quintanar Abarca.* *I will explain that in class*

About the paper (Miscellaneous)

- I think I got the general idea from the paper but would like to understand the method in more depth, as I don't feel confident with the equations-*Kendra Corral Nájera I will explain that in class*

- I couldn’t understand the activation energy from the article? What does it correspond to? How can we solve for activation energy from the graph of tanδ to G*? What does tanδ correspond to? What does the graph of tanδ to G* mean? G* is the data we get from the G” and the G’ graph and the δ and omega (which is the frequency parameter). It represents the relaxation rate of the material at different omega. But don’t know what does both the tan δ graphs actually means from the slides? *Neda Karami (I recommendfor you togo and visit the video of the last class. I explain that. Could you please take a look to the video that is already in the Google Drive?*
- Will you please give us the answer to the questions from the assessment (both parts) with the order of the equations (if it is possible) so I can learn the concepts better? Not until everybody has handed out the exam
- (I didn’t factor in the influence of the end product usage (for fiber or blow molding processing) in some questions for example or simplified the MFI to inverse of viscosity in others. Meaning I didn’t look at the MFI as gram/10 min. cause if the viscosity is more, MFI will be proportionally reverse. Is this a true definition? I don’t understand your question
- I know you have a pretty busy schedule, and it takes a lot of effort to prepare all these materials. However just in case you find it useful, it will be nice to have an answer file to the assessment questions. What is la place transformation? *Neda Karami It is my style to present to group the solution to the assessment, I will do it tomorrow*
- In the Mavridis paper they mention the loss tangent many times and there is an equation for it, but I couldn't understand what it is, or if we saw it in class with a different name.-*Angel Manuel Villalba Rodríguez Loss tangent and tan δ is the same.*
- Could you please explain this relationship, according to the article: Long chain branched PE is Thermorheological Complex when Flow activation Energy is Stress/Modulus dependence. PE may still be considered “Thermorheologically simple” in the sense that all relaxation times have the same temperature dependence and all relaxation moduli have the same temperature dependence. -*Elnaz Hosseinzadeh The branhced materials have a non-simple behavior, you have to get b_T and the behavior dose not necessarliy foolow the WLFo Arrhenius model so you should look for a function to determine how the shift factor changes.*

Activation Energy

- How activation energy introduce a stress dependence in horizontal in equation 21? How can we extract the activation energy from the steady shear? *Marino Luna Espinoza I don´t think you can do it taht easy from steady shear*

- Can activation energies be standardized like thermodynamic properties of materials in a table? If this shifting is made, it can “save” the need to make more rheological test to a polymer? *Benjamín Alberto Moreno Núñez As I mentioned last class you can minimize the number of measurements if yopu know more about relaxation times and thier equations*
- I understand the activaition energies are for the predictions of the rheological response at other temepratures, but i dont really understand what it stands for. like what it represents on the material behavior-*Miguel Alejandro Pérez Salazar You can use Ea for later used in predctng the beahvior at other temperatures*
- What effect does the activation energy has in the mechanical properties of a polymer? *Diego Sebastián Ceciliano Franco The one we ar seeing now, can be used for melts, but there are ither expresions for the solid state*
- How do we calaculate the constants within the Arrhenius and WLF equations?-*Antonio Osamu Katagiri Tanaka Please watch tis video before today´session:* **Time Temperature Superposition https://www.youtube.com/watch?v=1toVAagbfXg**
- With the concept of Activation Energy from Chemistry, What does activation energy of polymer melt exactly mean? Does lower activation energy mean more efficient polymer melt flow? -*Elnaz Hosseinzadeh It has to do with the collission theory and the energy needed for something to happen*

Others

- I tried to solve the problem of the homework but I haven't done it, I have several questions about the steps, the procedure and the formulas that we have to use in every stage of the solution. So, I'm reading and watching videos to learn how to solve it but I don't have big skills in mathematics (mathematics are so hard for me), I hope we could check about the procedure today during the class. Thank you. *We will see it today in class*
- I have to work on the excel to see if some doubts arise, and maybe working on it will solve them.-*Marco Salazar Meza Ok*