THE SMART APPLE-BASED FOIL: THE ROLE OF PECTIN-GLYCEROL-LIPID INTERACTIONS ON THERMORESPONSIVE MECHANISM

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Natural polymer films represent a class of materials which primary advantages include a vast scope for modifying mechanical properties, conductivity, and a high degree of sensitivity to external stimuli, like temperature. The possibility of applying them to various substrates, makes them ideal for applications such as flexible wearable electronics, artificial skin, or biomedical devices. Such systems respond to external stimuli by changing electrical parameters [1]. The most commonly used natural polymers are cellulose, chitosan, or gelatin. However, these polymers have intrinsically, poor electrical conductivity. Given the abundance of carboxylic acid within macromolecules and its remarkable capacity to form hydrogels, pectin emerges as a promising candidate for this propose. In this studies pectin films (containing lipid and glycerol) were developed that changed their shape and electrical parameters (Fig. 1) under the influence of temperature. I found that the conduction occurs according to the Grothuss mechanism. The observed changes are strongly correlated with thermal phase transitions of the pectin films, such as the polymer glass transition and the lower critical dissolution temperature (LCST) [2].

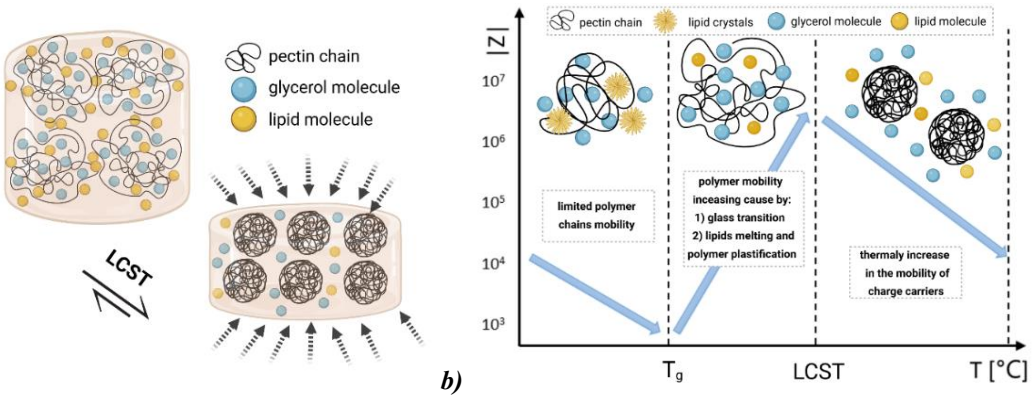

Figure 1. Scheme of pectin film thermal: a) shape change, b) conductivity mechanism [2]

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References:

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