

¹Reeha Sharma, ¹Roselyn Lata, ¹Tejesvi Patel, ¹David Rohindra

¹School of Agriculture, Geography, Environment, Oceans and Natural Sciences, The University of the South Pacific, Private Mail Bag, Suva, Fiji.

Introduction

❖ Poly L-lactic Acid (PLLA) and Poly (propylene 2,5- dicarboxylic acid) (PPF) are semi-crystalline biobased polymers having similar thermal properties and are potential alternative for non degradable plastics.

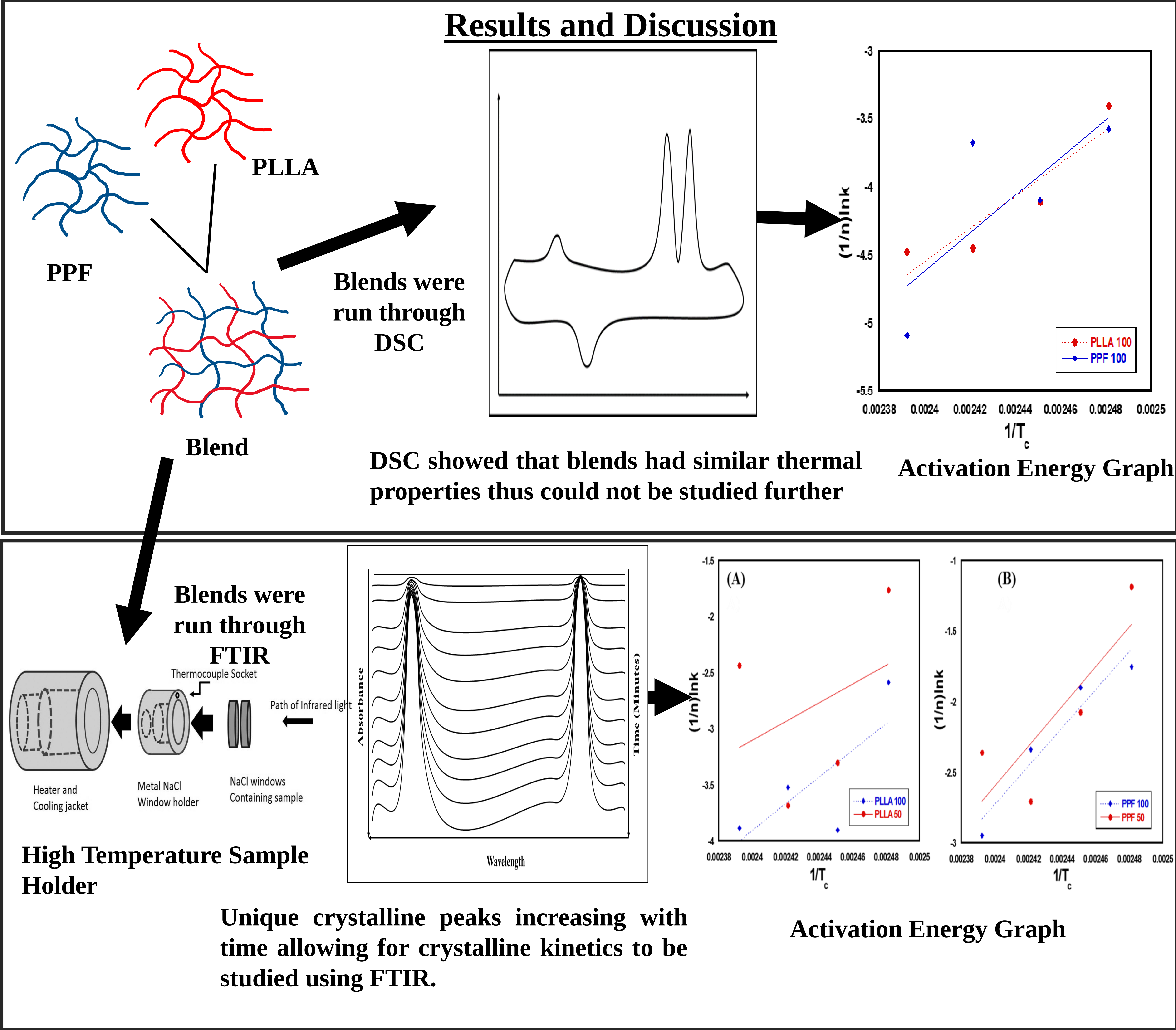
❖ For industrial purpose it is essential to understand the crystallization process which is based on the degree of crystallinity.

❖ High Temperature FTIR was used to study the crystalline properties of the two polymers in the blends having similar thermal properties.

❖ This technique is related to SDG 9 as this an innovative approach that will promote sustainable industrialization using biobased polymers.

Method

PPF and PLLA with percentage ratios were prepared through melt blending at 200 °C using a custom designed mini-mixer.



Polymers	Reported Activation Energy (kJ/mol)	FTIR Ea (kJ/mol)	DSC Ea (kJ/mol)
PLLA	-96.06 to -106.77	-99.14	-100.03
PPF	-	-112.29	-115.03

Table showing the activation energy of crystallization of PLLA and PPF using FTIR and DSC.

Conclusion

- ❖ The activation energy of the neat polymers calculated using FTIR and DSC were close to each other.
- ❖ Therefore, it can be stated that high temperature FTIR can be used to determine the activation energy and crystallization kinetics of polymer blends having similar thermal properties which is an innovative approach.
- ❖ Thus, the application of polymers for industrial purpose can be studied.