# Kinetic parameters from wood thermal degradation under vacuum to implement a mathematic model

LIN Bo-Jhih[1], PETRISSANS Anélie[1], ROUSSET Patrick [2], CHEN Wei-Hsin [3], PETRISSANS Mathieu[1]

[1] Laboratoire d'Etudes et de Recherches sur le Matériau Bois, EA 4370, Université de Lorraine, Faculté des Sciences et Technologies, Nancy, France.
[2] French Agriculture Research Centre for International Development (CIRAD), Montpellier, France.
[3] Department of Aeronautics and Astronautics, National Cheng Kung University, Tainan, Taiwan.
bo-jhih.lin@univ-lorraine.fr

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## Abstract

Wood heat-treatment technique has been developed rapidly in the past decades, it is an attractive way to improve the properties of wood, such as equilibrium moisture content (EMC), dimensional stability and durability [Candelier et al., 2013]. The treatment temperatures are in the range from 180 to 240 ℃, under an inert atmosphere [Candelier et al., 2016; Esteves and Pereira 2009]. Some advantages of wood treatment by the vacuum reactor are reported. The drying time of wood is decreased, and the end-product with lower volatiles which accelerate the degradation phenomena of wood [Torres et al., 2011; Sandak et al., 2015]. In the present work, the thermal degradation of wood under vacuum condition is investigated. Two different wood species, poplar (*Populus nigra*) and sapin (*Picea abies*), are examined in this study. The effects of operating conditions (temperature, heating rate and duration of treatment) on wood thermal degradation are studied. The reaction system involved four subsystems: heat treatment, balance measurement, vacuum compressor, and data collection. In addition, the properties of heated wood, such as higher heating value (HHV) and elemental analysis are examined. The experimental flow chart is shown in Fig. 1. These data will be useful to increase and improve an kinetic model to predict the weight loss percentage of wood during the heat treatment under vacuum condition. The kinetic model is based on Di Blasi approach [Di Blasic and Lanzetta 1997] and the kinetic parameters are calculated from the experiment results. As a whole, the obtained results and developing model are conducive to performing the heat treatment of wood in industry. Moreover, the operating cost of wood heat treatment can be reduced.

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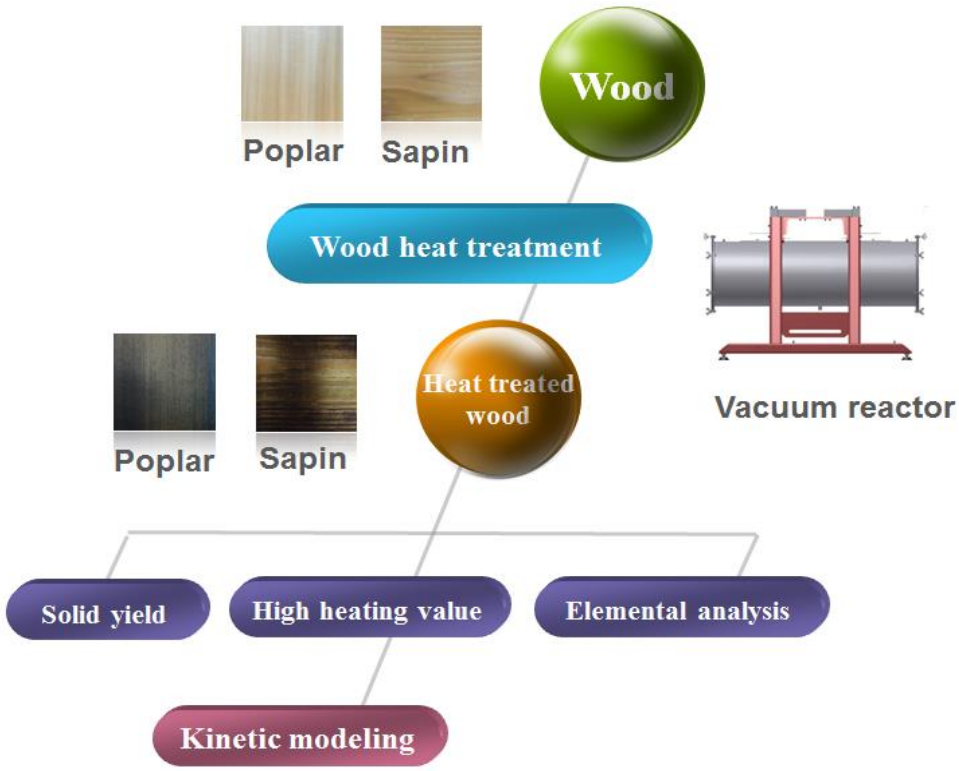


Fig. 1: Experiment flow chart of wood heat treatment under vacuum condition

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