11th International Conference
on Advanced Materials

Rio de Janeiro Brazil
September 20 - 25

ICAM2009

Wettability changes and mass loss during heat treatment in *Pinnus sp.* and *Hymenae sp.*

A.C. Ziglio(1)*, A. Brisolari(1), R. M. Oliveira(1), A.C. Soares(1), D. Gonçalves(1)

(1) São Carlos Institute of Physics, University of São Paulo, S. Carlos, SP, Brazil
* analinecz@yahoo.com.br

Abstract – Wood is a natural and complex polymer composed by cellulose, lignin, hemicellulose and extractives. We studied two species of wood *Pinnus sp* and *Hymenae sp* that were heat-treated. Both species showed a decrease in mass and higher values of contact angle with increasing temperature.

The wood has hydrophilic characteristics when in its natural form, but becomes hidrophobic after heat treatment due to the migration of functional groups from interior to the wood surface [1].

The purpose of this work is to characterize *Pinnus sp.* and *Hymenae sp.* (Jatobá) surfaces by the contact angle measurements. The wettability is an important parameter for characterization of wood surfaces and depends on factors such as cleaning state, orientation of the wood fibers, type of sample (sapwood or heartwood), drying, thermal and chemical treatments, surface roughness, etc [2].

Here the heat treatments were conducted at 100, 140 and 180 ^{o}C for 10 h. At the end of each treatment, the samples were stored in a glass box until temperatures reached 23 ºC. Then, the contact angles were measured by the sessile drop method by using a home-made goniometer. The samples showed a decrease in mass due to the loss of bound water and volatile extractives after thermorretification (Figure 1). Higher values of contact angles were obtained after increasing temperature, thus indicating a hydrophobic character for the torrefied woods (Figure 2).

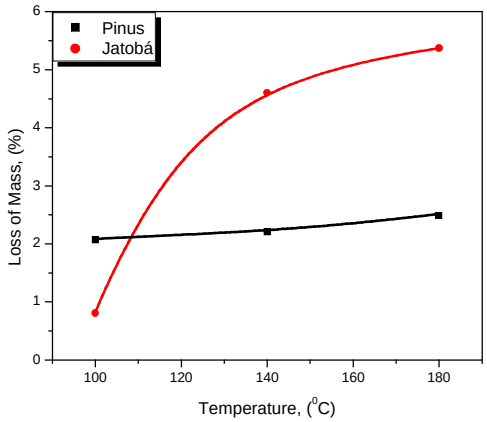

Figure 1. Weight loss as a function of heat treatment condition.

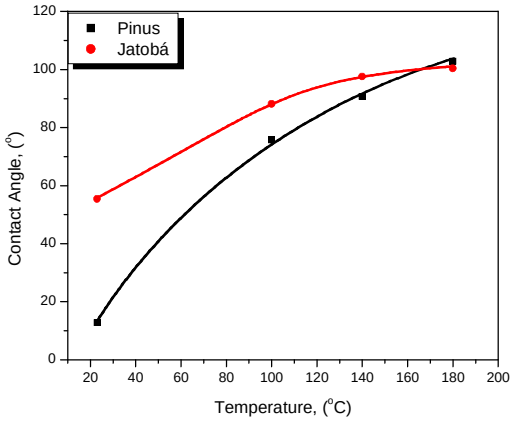

Figure 2. Contact angle values as a function of heat treatment condition.

References

[1] M. Hakkou, et al., Polymer Degradation and Stability. 89 (2005) 5.
[2] M. Gindl, A.Reiterer, G. Sinn, S.E. Stanzl-Tschegg, Holz Roh Werkst. 62 (2004) 273.