**Study and modeling of biopolymer PLA coalescence under the rotational molding conditions**

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Rotational molding is a manufacturing technique used to produce hollow parts from the polymer powders. One major problem for moulders is the presence of porosities in the produced parts. They harm the appearance and mechanical properties of the material. Air trapped between the grains leads to the formation of bubbles. At high temperature and near to the melting temperature, the powder particles merge together begin by reducing their total area. This phenomenon is one of important phenomena which govern the process, it is called coalescence of grains. The latter is the formation of a single elliptical particle from two particles under the effect of temperature and surface tension forces, this phenomenon is already extensively studied in the fields of ceramics and metal materials. In the case of polymers, in particular during the rotational molding process, the literature is still modest. Indeed, this work is devoted to experimental study and coalescence modeling of the polymer grains PLA.

The polylactic acid is a biodegradable and bioabsorbable polymer made from corn, and because of its features, it is successfully used in packaging, textile industries and in the medical field in particular in the realization of vascular prostheses. The conducted study was divided into two parts, the first is the spectral and thermal characterization of PLA and observing the coalescence phenomenon in different temperature, by busing Hot-stage technique. For the second part we tried to model this phenomenon by applaying the different literature models in order to present the PLA coalescence rate evolution under the implementation conditions.

As results we can say that the temperature is one of the main factors influencing the PLA coalescence, and the best model wich described this phenomenon is Bellehumeur compared to the others models of litterature.