

Ph.D. defense

Institut de Chimie Séparative de Marcoule / CEA Marcoule
(UMR 5257, CEA, CNRS, Université Montpellier 2, ENSCM)

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will present her Ph.D. dissertation

Study of biomass treatment through hydrothermal conditions for the recovering of high value molecules and materials

The defense will take place on **Thursday, December 18, 2014 at 10:30 am**
in the ICSM Auditorium

Population growth, coupled with a general increase in standard of living, result in a booming demand for raw material and energy. To face this challenge, an increased attention is paid to the use of renewable energies and natural resources. Among them, biomass is especially promising. Its advantages (abundance, distribution all over the Earth) are balanced by several drawbacks (low energy density, high moisture content,...). To overcome these problems, torrefaction is the most traditional way, but it has some inconveniences (increased ash content, loss of material). Hydrothermal carbonisation (HTC) is a possible alternative. The purpose of this thesis is the study of HTC a means to beneficiate the lignocellulosic biomass. Three main aims were identified: increase of the energy density, recover molecules and minerals of interest. The study initially focused on HTC of molecular model systems present in wood. Beech wood was also studied, as a model biomass. This study allowed determining optimal experimental conditions for treatment of further biomasses. Finally, other activation methods have been tested, such as microwaves, and supercritical fluids. Hydrochars obtained after HTC feature a concomitant decrease of the atomic H/C and O/C ratios. Liquid phase contains different molecules of interest (furfural,...). Finally, ash content decreases after HTC owing to a partial leaching of some elements (alkali and alkaline earth metals). In conclusion, HTC seems to be an interesting alternative to torrefaction as it allows for the production of hydrochars suitable for gasification, and the recovery of molecules and minerals of interest. The interest and technical feasibility have been demonstrated in particular for biomasses with high moisture (agricultural crops) or with high pollutant contents (grounds of waste disposal).

Keywords: Biomass, Polysaccharides, Hydrothermal Carbonisation.

