

**Title: Thermochemical liquefaction as a tool for the development of sustainable raw materials for polymers**

Rui Galhano dos Santos, DEQ/IST, CERENA, Portugal

João C. Bordado, DEQ/IST, CERENA, Portugal

**Abstract:**

The R&D sector, facing of the sharp signs of the depletion of petroleum and its harmful effects and consequences in the environment, has started a long time ago to explore solutions to reuse by-products and wastes, to restore them to produce materials and energy. Many may argue, but the call for new economic models and resources is getting louder. Is now the time to take the ‘circular economy’ concept one step further, preparing the ground for its full adoption. A new paradigm and economic models, involving greener processes and raw materials, are vital to assure the livability of the planet for the generations to come. Targeting a low-carbon economy, aimed by the European Commission, concepts such as bio-refineries, circular economy, and neutral emission cycles play a vital and crucial role in the conversion of waste into valuable resources.

In this scenario, underpinned by a transition to renewable energy sources and materials, our work is focused on the development and implementation of a Technological Platform for the Production of Chemicals/Biofuels by upgrading wastes and biomass. The critical process of the entire platform is the Thermochemical Liquefaction in polyhydric alcohols. The afforded bio-oil can then be valued by the extracting some of its most interesting components to be applied as chemicals to be used as raw materials in the formulation of polymers/materials.

**Acknowledgments:**

The authors gratefully acknowledge the support of the CERENA (strategic project FCT-UID/ECI/04028/2019).



Fig. 1. General Conditions of thermochemical liquefaction

**Biography:**

Dr. Rui Galhano dos Santos graduated in Chemistry Degree at the University of Lisbon – Faculty of Sciences (Lisbon, Portugal) in 2006. He obtained his PhD on January 2013 with the maximum qualification: Excellent “Magna Cum Laude”. During this period, he was also awarded with several grants for his research in the Instituto Superior Técnico at Technical University of Lisbon (Lisbon, Portugal). Presently he is a Researcher at CERENA in IST. He has published more than 30 papers in scientifically reputable journals and presented several oral/invited communications in international scientific recognized symposia around the world. He is also co-inventor in several patents. Presently, his studies are mainly focused and involve the studies and development of new strategies to up-cycle biomass for the production of added-valuable chemicals and/or goods as well as for the productions for bio-fuels. In early 2016, Dr. Galhano dos Santos become a permanent member of CERENA-Centre for Natural Resources and the Environment.