

ADVANCE RECYCLING CONFERENCE

Title: Composites: EoL solutions using chemical recycling technologies

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Abstract

Because of the advance in plastic materials, society is currently facing one of the greatest challenges of our time, which is to find a useful end of life for the large amount of plastic waste that is being generated, thus reducing the consumption of fossil resources, maintaining the long-term sustainability of the supply chain and the negative impact of these materials on the environment. Composites, which are the main plastic used in wind blades and airplanes are very difficult to recycle due to their heterogeneous composition and most of this waste is landfilled, only a small part is shredded to be reused as fillers.

It is estimated that next year around 42,000 turbines will be dismantled in Europe, almost half of which are in Spain, generating a waste of 1.5 million tonnes of composites. Regarding the aerospace industry, it is estimated that 10.000 airplanes will be dismantled during the next 20 years all over the world.

In AIMPLAS we are working on different chemical recycling technologies like pyrolysis (thermal cracking above 450°C in inert atmosphere) and solvolysis (depolymerization technique using mild temperatures, solvents and catalysts) through some Research and Development projects like EROS and ELIOT.

In the EROS project, a real circular economy system is implemented, which starts with the mechanical and chemical recycling of wind blades and waste from the aeronautical sector to close the cycle and use the recovered materials (glass fibre/carbon and glycols) in other sectors such as the ceramics industry, including supports, frits, glazes and inks, and in the transport sector itself. Regarding biocomposites, the project ELIOT will achieve a full-scale demonstration for the best two EoL methods selected after deep research between 12 currently available EoL technologies for two target biocomposites including, their technical validation at pre-industrial scale and their validation in terms of life-cycle sustainability. These EoL methods will be ready to be further scaled up in industrial environments.