

RECYCLING & WASTE MANAGEMENT

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Exploring new horizons and sustainable technologies for recycling and waste management

Sub- and super critical fluids-based technologies are developed for more than 40 years. Years after years, the sub- and supercritical fluids route finds new applications in the field of materials processing but also materials recycling. In the last 25 years, the use of water and carbon dioxide as solvent has been extended to other fluids to increase the versatility of this materials recycling approach considered as sustainable technologies. After an introduction to the specific properties of sub- and super critical fluids, this presentation will be focused on the interest and potentialities of these advanced technologies. This will be illustrated with examples going from waste management to recycling: i) waste water treatment by Super Critical Water Oxidation (SCWO), ii) Super Critical Biomass Valorisation (SCBV) to produce energy and platform

molecules, iii) recycling of plastics and carbon fibers from CFRPs, iv) recycling of permanent magnets and solar cells. At the end, the state of development of these sub- and super critical fluids-based technologies will be discussed.

Speaker Biography

Cyril Aymonier is CNRS senior researcher in charge of the department "Super critical Fluids" of ICMCB (about 25 people). His current research interests are i) the study of the chemistry and nucleation & growth in super critical fluids applied to the design of advanced nano structured materials, ii) the study of materials recycling using super critical fluids and iii) the development of the associated super critical fluids based technologies. Cyril Aymonier has so far authored/co-authored 122 peer-reviewed journal articles, 7 book chapters and 30 patents. He was awarded by the CNRS bronze medal in 2011.

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