

## **Use of waste from pyrolysis to rejuvenate bitumens and improve its mechanical properties**

**Michele Porto**

Department of Chemistry and Chemical Technologies, University of Calabria

Over the years, recycling and resource recovery have become increasing popular and above all mandatory not only to reduce environmental pollution but also to create a regenerative circular economy. The proper disposal of waste materials not only improves environmental health but also protects the health of individuals in the environment due to generally reduced exposure to potentially toxic substances. Municipal Solid Waste (MSW) is a type of biomass which is obtained as a result of daily life activities of individuals, industries, animals, machinery and so on. This waste product must be properly disposed of in order to avoid environmental degradation and achieve set circular economy goals. MSW consists of waste substances which however still possess energy in the form of chemical bonds which exist between carbon, hydrogen and oxygen molecules. This makes MSW a highly potential source of bio-energy and this type of renewable energy is being put in place to substitute energy derived from fossil fuels which at the moment contribute largely to high levels of global carbon emissions. In the same vein, the objective of this study is the comparison of pyrolysis and gasification procedures as methods of MSW treatment. This study is also aimed at taking a look into the by-products gotten from each of these procedures and the variation in their respective compositions and potential utility in the

generation of bio-energy. Only in recent years have pyrolysis and gasification been looked into more closely with the aim of technical improvement and optimizing these processes even though both these processes have been around for a long time. The main objective of this research study is to evaluate these processes and determine which one of them is more advantageous in the development of Waste to Fuel (WtF) or Waste to Energy (WtE) methodologies compared to conventional MSW incineration and combustion. The indications gotten from the results of this study suggest that gasification is a better process compared to pyrolysis due to the production of a gas by-product which cannot be gotten by pyrolysis. This research study also shows that pyrolysis presents problems in industrial plant due to the clogging of the pipes and tubes as a result of char deposition.

### **Speaker Biography**

Michele Porto is currently a post-Doc student at the Chemistry Department of University of Calabria. He gained his master degree in 2017 working on Mean Field Models applied to Biaxial Nematic liquid crystals. He is author/co-author of 17 papers on international peer reviewed journals. Actually, he is working on recycling of waste materials, mainly from industrial production, trying to obtain new bituminous binders for asphalt production.

**michele.porto@unical.it**

**Received:** Jan 17, 2022; **Accepted:** Jan 20, 2022; **Published:** Feb 28, 2022