

PYROLYSYS AND GASIFICATION OF WASTE DERIVED FUELS: HISTORY AND PERSPECTIVES

Dmitrijs Porsnovs

Juris Burlakovs

Maris Klavins

Department of Environmental Science, University of Latvia, Latvia

Abstract

Waste management is one of the central environmental challenges in today's linear economy. Moreover, we are forced to admit that the concept of linear economy as well as the term "waste" itself are outdated and does not meet today's needs of humanity. Recycling and reusing become the main approaches of waste management and many countries are bringing their economies closer and closer to the concept of circular economy. While, also developing this concept we need to take in account that infinite recycling is impossible: today's technology allows to recycle some kinds of plastic several times, and this number is even smaller, if we are speaking about cellulosic materials. It means that by recycling we cannot avoid the end of life management of these materials, it is possible only to postpone it, so traditional recycling technology is not a solution that allows to achieve circulation of carbon in economy. Even less this goal can be achieved using waste incineration, that not only wastes carbon as a resource, but also is a source of atmospheric pollution and serious problems connected with it.

Pyrolysis and gasification are alternative thermal processing approaches suitable for most of carbon containing wastes, that probably can overcome mentioned problems. This approach still can not be considered as well developed, while multiple technologies are established and successfully commercialised. The aim of this study is to review historical development of pyrolysis and gasification technologies, to characterise physical and chemical processes characteristic for waste pyro-gasification as well as to examine future perspectives of such approach. Literature review and statistical analysis of literature data are used to achieve this aim. Results show great perspectives of this approach.

Keywords: Pyrolysis, Gasification, Waste Management