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Anthony Bridgwater

Aston University, UK

Upgrading liquids from fast pyrolysis of biomass

Fast pyrolysis for production of high yields of liquids (bio-oil) has now reached commercial reality, and there continues to be considerably increasing activities at the R&D level to develop processes and improve the quality of the liquid. The technology of fast pyrolysis is described followed by a comprehensive examinationof the characteristics and quality requirements of bio-oil. This considers all aspects of the special characteristics of bio-oil – how they are created and the solutions available to help meet requirements for utilisation. Particular attention is paid to chemical and catalytic upgrading including,for example, incorporation into an oil refinery, production of hydrocarbons, chemicals, synthesis gas and hydrogen production which have seen a wide range of new research activities. An appreciation of the potential for bio-oil to meet a broad spectrum of applications in renewable energy has led to a significantly increased R&D activity that has focused on addressing liquid quality issues both for direct use for heat and power and indirect use for biofuels and green chemicals. This increased activity is evident in North America, Europe and Asia with many new entrants as well as expansion of existing activities. The only disappointment is the more limited industrial development and also deployment of fast pyrolysis processes that are necessary to provide the basic bio-oil raw material.

Biography

Anthony Bridgwater is Professor of Chemical Engineering at Aston University in Birmingham UK. He has worked at Aston University for most of his professional career and is currently director of the European Bioenergy Research Institute. He has a world-wide research portfolio focussing on fast pyrolysis as a key technology in thermal biomass conversion for power, heat, biofuels and biorefineries. He is a Fellow of the Institution of Chemical Engineers and a Fellow of the Institute of Energy. He was technical Director of the UK Flagship SUPERGEN Bioenergy programmes for 8½ years until the end of 2011. In addition he has led and coordinated nine major EC research and development projects in bioenergy and has an active current involvement in six further research and development projects. He has attracted funding from national research funding councils in Canada, Holland, Norway and the USA. He formed and led the IEA Bioenergy Pyrolysis Task – PyNe from 1994 to 2008 with parallel European networks on pyrolysis, gasification and combustion which included the EC sponsored ThermoNet and ThermalNet networks.

a.v.bridgwater@aston.ac.uk

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