

BURNERS, COMBUSTION AND HEAT TRANSFER

(618) - THE COMBUSTION OF DROPLETS OF LIQUID BIO-FUELS AND FINELY DIVIDED BIOMASS PARTICLES

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The combustion of droplets of liquid bio-fuels and finely divided biomass particles

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Many studies have been made of the combustion of droplets of liquid hydrocarbons, including aviation kerosene, diesel and heavy marine fuels. Fewer studies have been made of the newer biofuels such as FAME, the alcohols, especially ethanol and n-butanol and the newer oxygenated biofuels such as ether derivatives. These new fuels typically contain a significant amount of oxygen, leading to different combustion behaviours. Details are given of the estimated burning rates.

Even fewer studies have been published about finely divided pulverised solid biomass materials such as pine wood and miscanthus which burn in an analogous fashion to droplets of the bio-oils. These heterogeneous mixtures are difficult to model and have challenges for experimental work. Information is given in this paper on the burning rates of both the liquids and the solids combustion, and data given on soot formation tendency for the different fuels.

The mechanism of soot, PAH and NO_x formation is discussed in relation to (1) volatile carbon containing liquid fuels such as alcohols and biomass esters, (2) liquid fuels having low or near zero carbon contents fuels, and (3) combustion of ultra-fine biomass particles.

Palavras-chave : droplets, bio-fuels, biomass , particles