

CATALYSIS FOR THE VALORISATION OF BIOMASS FOR ENERGY PRODUCTION AND MANUFACTURE OF VALUABLE INTERMEDIATES AND PRODUCTS

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The aim of this part is to show how considerable would be the impact of biomass use on the diminution of CO₂ emission. This potential impact is compared for different technologies aimed at the same purpose. It seems that a large proportion of these 'future technologies' cannot have a quantitatively large impact. Some other ones will need many years to develop. This is the case of nuclear fusion, for which 40 years are often mentioned, with still much uncertainty concerning radiation-resistant materials that could be used and the corresponding amount of radioactive waste.

In terms of energy equivalent, the potential of biomass production comes second only to nuclear energy or the direct use of solar energy using photo-voltaic cells. The competition for cultivation land with food production makes that biomass must be used in the most efficient way. This implies that, taking as a basis one energy unit contained in biomass, the transformation should give the highest amount possible of energy in the form of easily used products. The present development of the world primarily points to liquid fuels. Catalysis is involved in practically all processes used presently or under study to produce liquid fuels. The focus of the lecture will be a line of production based on the liquefaction of biomass followed by some refining to produce a liquid fuel suitable for use in engines or turbines. Catalysis is crucial for this second step. This line of production is much less investigated than other ones favoured by agricultural and industrial lobbys

Data will be presented when available. It seems that only two lines are potentially the most effective: biomass gasification (followed by, for example, Fischer-Tropsch synthesis) and pyrolysis (catalytic or thermal) followed by refining. Data seem to be still lacking concerning full energy balance concerning the first. Comparisons concerning the second will be presented.

2 MANUFACTURE OF INTERMEDIATES AND VALUABLE PRODUCTS

When CO₂ emission savings are considered, the potential impact of the manufacture of chemical products is several orders of magnitude lower than that of energy production. The corresponding part in the lecture will therefore be shorter than that concerning energy. Nevertheless, this cannot be neglected and a chemistry based on biomass begins to undergo an important development. The main lines, present and future, will be outlined

INTEGRATION OF PROCESSES USING BIOMASS

The necessity, both technical and economic, to associate in large groups several different process is emerging. This became obvious in the narrower field of energy production. Now, the relatively bright potential of chemicals produced from biomass suggests that sorts of large complexes ('bio-refineries') will be created in the future.