



Renewable energy from biomass: a sustainable option? - Hydrogen production from alcohols

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Sustainable development requires us to find new energy sources instead of fossil fuels. One possibility is the hydrogen fuel cell, which uses significantly more efficient than the current combustion engines. The task of the hydrogen is clean, carbon-free renewable energy sources to choose in the future by growing degree. Hungary can play a role in the renewable energy sources of biomass as a renewable biomass annually mass of about 350 to 360 million tons. The biomass is only a very small proportion of fossil turn carbonaceous materials substitution, while we may utilize alternative energy sources as well. To the hydrogen production from biomass, the first step of the chemical transformations of chemical bonds are broken, which is always activation energy investment needs.

The methanol and ethanol by fermentation from different agricultural products is relatively easy to produce, so these can be regarded as renewable energy carriers of. The ethanol can be used directly, and used in several places in the world are mixed with the petrol additive. This method is the disadvantage that the anhydrous alcohol is to be used in the combustion process in the engine more undesired by-products may be formed, and the fuel efficiency of the engine is significantly lower than the efficiency of the fuel cells.

More useful to produce hydrogen from the alcohol and is used in a fuel cell electric power generation. Particularly attractive option for the so-called on-board reforming of alcohols, that happens immediately when the vehicle hydrogen production. It does not need a large tank of hydrogen, because the hydrogen produced would be directly to the fuel cell. The H₂ tank limit use of its high cost, the significant loss evaporation, the rare-station network, production capacity and service background and lack of opportunity to refuel problems. These can be overcome, if the hydrogen in the vehicle is prepared. As volume even 700 bar only about half the H₂ pressure gas can be stored in the case, than the same volume of ethanol-water mixture can be prepared.

The renewal of alcohol, the alcohol-water mixture is then passed through the catalytic reformer into a preheater. The exhaust gas contains a relatively large number of carbon monoxide, which would spoil the fuel cell, so the carbon monoxide concentration to a high and a low temperature water-gas reaction is reduced. This increases the hydrogen production. The last step of the carbon monoxide content to eliminate preferential oxidation. The alcohol reforming catalyst for the precious metals spread most of what arose from high activity and stability. However, the precious metals are very expensive, so a non-precious metal catalysts is the design and development of objective activity and stability which reaches the precious metal catalysts of.

Using the new reaction catalysts opportunities are created, which are smaller than the activation energy than the non-catalytic process. The basic objective of the technological developments more active at lower temperatures, the selective target product, long-life, low cost design catalysts.