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DIMETHYL ETHER AND DIBUTYL ETHER AS SUBSTITUTE FOR FOSSIL DIESEL

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In the project Traismauer, we showed the production of dimethyl ether based on waste wood and waste biomass with the properties of solid phase with water content between 35 to 15%. Combustion of contaminated waste biomass in classical boilers is very difficult and lead only to the production of heat. The cleaning of the exhaust leads to efficiency losses. From heat, it is very difficult and very inefficient to produce dimethyl ether. Therefore, we used gasification to gain a weak gas, which can be used for steam gasification of biomass to reduce biomass and biochar to a synthetic gas with high content on carbon monoxide and hydrogen and carbon dioxide. This synthetic gas is cleaned, prepared and used for the production of dimethyl ether. The efficiency of the process is very high, the conversion efficiency of synthetic gas to dimethyl ether is shown and the calculation is compared with the measurements and results. In the project Hagenbrunn, we showed the combination of steam gasification and biogas to enlarge the production of dimethyl ether. In turn, the energy efficiency and the conversion efficiency in the production of dimethyl ether are shown. In the project Hagenbrunn, we also converted dimethyl ether combined with carbon monoxide (carbonylation) and hydrogen (hydrogenation) to ethanol as an intermediate step to reach butanol by aldol condensation. Butanol is in the last step dehydrated to dibutyl ether. The production efficiency, the energy consumption is compared with the known results of the ABE fermentation process. The properties of dimethyl ether are compared with the properties of the dibutyl ether used as a substitute of fossil diesel applied to heavy trucks like VOLVO, MAC TRUCK using today dimethyl ether in commercial trucks.

Biography

Johann Gruber Schmidt has completed his PhD in Mechanical and Chemical Engineering from Technical University Vienna in 1992. He then started at Waagner Biro GmbH in plant division. In the year 2000, he moved to the projects in renewable bioenergy in Lower Austria, where he worked in erection and commission till 2003. In the following years, he designed and erected biomass and biogas CHP plants in Austria and turned to the field of small fixed gasification redesigning a prototype plant with mainly focus on gas cleaning and gas preparation and conversion for CHP Units. In the year 2011, he started biogas upgrading project to biomethane and syngas finished at 2013. From this time on he worked on the field DME and zero emission application in realizing projects in the power range up to 5000 kW till today and attends besides the projects congresses in agriculture and renewable energy and gives oral presentations.

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