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INSTITUTE OF ENERGY PROCESS ENGINEERING AND CHEMICAL ENGINEERING

PROFESSORSHIP OF ENERGY PROCESS ENGINEERING

Plas4Plas

Plasma-assisted recycling of glass-fibre reinforced plastics

CHALLENGE

Complex materials such as GFRP and CFRP composites – increasingly used in wind turbines, aviation, and automotive engineering – pose enormous problems in terms of its recycling. Conventional processes such as incineration or pyrolysis fail to completely recycle the fibers, emit an average of 2 tons of CO_2 per ton of GFRP waste, and generate hazardous fine dust particles. By 2040, specifically wind turbine rotor blades will generate over 560,000 tons of this kind of waste. In order to close material cycles and reduce CO_2 emissions, innovative processes for the efficient and low-emission processing of these resources are urgently needed.

OUR PROJECT

Gasification using steam arc plasma represents an innovative and emission-free approach to the material recycling of discarded fiber-reinforced plastics. By using a 65-kW plasma, temperatures well above 2,000 °C can be achieved even without any oxygen supply, which promotes the conversion of the inert glass and carbon fibers contained in the material. This produces high-purity synthesis gas (H_2/CO) for the chemical industry and a silica-rich melt as a raw material for the glass industry and thus for the production of new glass fibers. The process binds carbon in the long term, minimizes CO_2 emissions, and can be operated in a completely climate-neutral manner when using renewable energies. From a purely economic point of view, a further advantage is the avoidance of additional costs due to CO_2 emissions or the purchase of CO_2 certificates for compensation purposes.

PARTNERS

- Leibniz-Institut für Plasmaforschung und Technologie e.V. (INP)
- Institut für Umwelt & Energie, Technik & Analytik e.V. (IUTA)

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