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Closing the life cycle of waste fiber reinforced polymer composites by converting it into valuable products

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Polymer composites reinforced with fibers (FRP) are used in almost every type of advanced engineering structure, such as in industrial applications, automobiles, aeronautics, constructions, sports etc. According to the Composite Market Report, the usage of FRP composites exceeded 8.8 million tons in 2014 and continues to grow with a very fast rate. However, despite the successful applications of FRP composites, recycling at the end of the life cycle is associated with major difficulties, due to the cross-linked nature of the thermoset polymer. Therefore, the majority of the FRP composites are currently land-filled or incinerated. These abolition methods are not sustainable in the long term and lead to negative impact on the environment. Chermical degradation of FRP composite waste has shown very promising results. With temperatures in the range of 260-325°C and pressures down to 50 bar, it has been possible to convert the waste into usable end products. This includes: Recovery of expensive monomers with high purity, which can be used to produce new polymers, conversion of the polymer into a potential fuel with high calorific value and recovery of fibers with retained mechanical properties. With these results, the FRP composite end of life cycle can be closed in an environemental and economical beneficial way. Furthermore, some of these achievements have not been attained previously, providing important knowledge in the field of composite recycling.

Biography

Hülya Ucar Sokoli is pursuing her PhD from Aalborg University Esbjerg. She is part of a 2.7 mill Euro Innovation Consortioum (GENVIND), who's goal is to develop technologies for sustaniable recycling of polymer composites. She is working on chemical degradation of FRP composite waste and is currently the only PhD in Denmark working on this topic.

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