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Three phase Z-source multilevel inverter system for renewable energy application

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The demand of electricity in upcoming days is rapidly increasing. The optimum solution over this problem can be obtained by using Renewable Energy system (RE-System). Wind energy can be considered as one of the source from renewable energy. Wind is inexhaustible, clean and free source. Wind is normally variable in nature hence the energy generated at turbine end from wind is also with variable output voltage and variable output frequency. These parameters are dependent on wind velocity and direction. The drawback observed in the traditional system is about variable output power. Generally this variable input gets converted to DC supply and further to AC supply using voltage source inverter (VSI). Since the wind energy output is very low and need to connect extra DC chopper circuit at the output of rectifier to boost the voltage before inverter. Z-Source Multilevel Inverter (Z-Source MLI) provides a practical solution to overcome the above mentioned problem. Z-Source MLI consists of less number of components and it is cost efficient. For low power application, wind turbine can be run on single phase AC supply but in case of higher power applications three phase supply is needed. Hence single phase AC supply is transformed to three phase AC supply using Z-Source MLI. The efficient operation is maintained even though low voltage is there due to low wind speed. If there is higher wind speed, gives higher voltage, the system can operates like normal VSI and need not to boost the voltage. The controlling can be done by controlling modulation index. Major roll of this Z-Source MLI is to take care of both input voltage and load variation.

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Co-pyrolysis of polymer and biomass wastes: Energy production and environmental application

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Co-pyrolysis of polymer and biomass wastes was investigated as a novel method for waste treatment and synthesis of enhanced biochar. Co-pyrolysis of rice straw (RS) with polypropylene (PP), polyethylene (PE) or polystyrene (PS) increased the carbon content, cation exchange capacity (CEC), surface area and pH of the biochar. As a result, the sorption of 2,4-dinitrotoluene (DNT) and Pb to polymer/RS-derived biochar was markedly enhanced. The increased aromaticity and hydrophobicity may be responsible for enhancing the DNT sorption to the polymer/RS-derived biochar. In contrast, increasing CEC, higher pH and the newly developed surface area may account for the enhancement in Pb sorption. The addition of polymer to RS did not significantly change the catalytic role of biochar during the reduction of DNT by dithiothreitol. Our results suggest that co-pyrolysis of RS and polymer can improve the biochar properties to enhance the sorption of DNT and Pb.

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