

Effect of Temperature Condition in Extracting Carbon Fibers on Mechanical Properties of Injection Molded Polypropylene Reinforced by Recycled Carbon Fibers

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Abstract : The purpose of this study is to investigate the proper condition in extracting carbon fibers as the reinforcement of composite molded by injection method. Recycled carbon fibers were extracted from wasted CFRP by pyrolyzing epoxy matrix of CFRP under air atmosphere at different temperature conditions 400, 600 and 800°C in this study. Recycled carbon fiber reinforced polypropylene (RCF/PP) pellets were prepared using twin screw extruder. The RCF/PP specimens were molded into dumbbell shaped specimens using injection molding machine. The tensile strength of recycled carbon fiber was decreased with rising pyrolysis temperature from 400 to 800°C. However, superior mechanical properties of tensile strength, tensile modulus and fracture strain of RCF/PP specimen were obtained when the extracting temperature was 600°C. Almost fibers in RCF/PP specimens were aligned in the mold filling direction in this study when the extracting temperature was 600°C. To discuss the results, the failure mechanisms of RCF/PP specimens was shown schematically. Finally, it was concluded that the temperature condition at 600°C should be selected in extracting carbon fibers as the reinforcement of RCF/PP composite molded by injection method.

Keywords : CFRP, recycled carbon fiber, injection molding, mechanical properties, fiber orientation, failure mechanism

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