Accepted Manuscript

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PII: S1359-8368(16)31285-9

DOI: 10.1016/j.compositesb.2016.12.009

Reference: JCOMB 4764

To appear in: *Composites Part B*

Received Date: 12 July 2016

Revised Date: 25 October 2016

Accepted Date: 4 December 2016

Please cite this article as: Kim K-W, Kim D-K, Kim B-S, An K-H, Park S-J, Rhee KY, Kim B-J, Cure behaviors and mechanical properties of carbon fiber-reinforced nylon6/epoxy blended matrix composites, *Composites Part B* (2017), doi: 10.1016/j.compositesb.2016.12.009.

Cure behaviors and mechanical properties of carbon fiber-reinforced nylon6/epoxy blended matrix composites

Kwan-Woo Kim[1,2], Dong-Kyu Kim[1], Byoung-Suhk Kim[2], Kay-Hyeok An[3], Soo-Jin Park[4], Kyong Yop Rhee[5], and Byung-Joo Kim[1,†]

[1]R&D Division, Korea Institute of Carbon Convergence Technology, Jeonju 54853, Korea

[2]Department of Organic Materials & Fiber Engineering, Chonbuk National University, Jeonju 54896, Korea

[3]Department of Advanced Nano Materials, Jeonju University, Jeonju 22212, Korea

[4]Department of Chemistry, Inha University, Incheon 55069, Korea

[5]Department of Mechanical Engineering, Kyung Hee University, Yongin 17104, Korea

([†]kimbj2015@gmail.com)

Abstract In this work, the composition effects of a nylon6 and epoxy blend system on the cure behaviors and mechanical properties of carbon fiber-reinforced nylon6/epoxy composites were investigated. Ethanol was used as a melting agent for nylon6 (alcohol-soluble nylon), and the content of nylon6 in the mixture was 0 to 50 wt.%. The curing properties of the blend system were investigated by differential scanning calorimeter (DSC), thermogravimetric analysis (TGA), and fourier transform infrared spectroscopy (FT-IR). The surface morphologies of the fractured surfaces were observed by scanning electron microscopy (SEM). The mechanical properties of the composites were measured with the Charpy pendulum impact test to observe the cumulative energy absorption until final destruction of the composites. The Charpy energy of the N4:E6 sample was enhanced by 52% compared to that of the pure epoxy. This resulted from the curing relation between the composition of nylon6 and epoxy.

Keywords: nylon/epoxy, CFRP, carbon fiber, composites, curing system, impact properties