Title

FABRICATION OF FIBER ORIENTATION ON COMPOSITES WITH HIGH DISCONTINUOUS CARBON FIBER CONTENTS

Abstract text

Recently, carbon fiber reinforced plastics (CFRP) are attracting attention at automobile, airplane and these associated fields because CFRP is lightweight material. Carbon fiber is light compared to glass fiber, and has robust mechanical properties. On the other hand, a large quantity of discontinuous carbon fibers is exhausted when CFRP is cut or is performed by mechanical drill. In the existing conditions, these discontinuous carbon fibers are disposed as an industrial waste. If CFRP is used in various industrial fields in the future, the development of CFRP which is composed of discontinuous carbon fibers is of importance. Particularly, the improvement of mechanical properties on discontinuous carbon fiber / resin composites is an important theme. It is known that mechanical properties of FRP are affected by fiber length, fiber contents and placement state of fibers. The improvement of mechanical properties can be expected to by fiber orientation and high discontinuous carbon fiber loadings.

It is known that injection molding leads to the orientation of discontinuous short fibers. However, the content of carbon fibers is limited to 40 wt. % or less due to low fluidity of carbon fiber / resin composite.

In this work, we studied fabrication of fiber orientation on CFRP with discontinuous carbon fiber at high fiber loading. The discontinuous fiber-oriented CFRP were developed at fiber loading of 40 vol.%. Fiber orientation was estimated by optical microscope and X-ray computed tomography. As a result, it found that the fiber orientation is dependent on the plastic state of carbon fiber / epoxy resin composite. Mechanical properties of CFRP composed discontinuous carbon fibers were significantly improved by the orientation and adjustment of placement of carbon fibers.

Keywords

CARBON FIBER, EPOXY RESIN, COMPOSITE, ORIENTATION

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