Faculty of Engineering
Tokushima University

Development of Sustainable Composite Materials

Professor Hitoshi Takagi

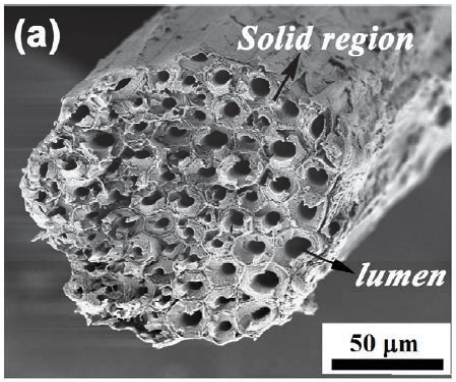

Fig. 1 Internal microstructure of natural fiber.
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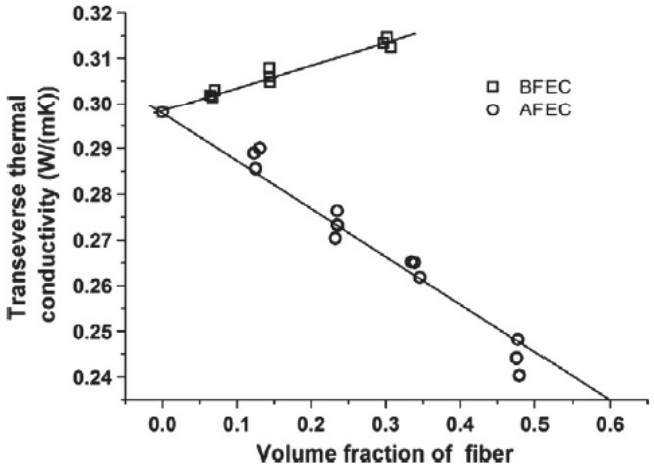

Fig. 2 Thermal conductivity vs. fiber content.
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Content:

Glass fiber-reinforcing plastics (GRRP), that are widely used until now as a lightweight structure material, are produced from exhaustible resources, in addition there are difficult recycling problems in GFRP. We are now carrying out research work on natural fiber-reinforced polymer composites (sustainable composites), that have equivalent mechanical characteristics with GFRP, and their environmental load is much lower than that of GFRP.

Though the natural plant fibers have inferior strength properties to glass fibers, however natural fiber has the cavity called a lumen in the inside, as shown in Fig. 1. Therefore, it is expected that various functional properties are derived from this unique internal microstructure. For example, since the air filled in the lumen has smaller thermal conductivity than many solid materials, it has been demonstrated that the thermal conductivity of the natural fiber-reinforced composites have excellent thermal barrier properties (Fig. 2). We have been examining the relationship between thermal properties of the natural fiber-reinforced composites and internal microstructure of the natural fiber.

Keywords : Green composites, Cellulose nanofiber, Functionality, CFRP

E-mail: takagi@tokushima-u.ac.jp
Tel. +81-88-656-7359
Fax: +81-88-656-9082
HP : http://www.me.tokushima-u.ac.jp/takagi/