

Title : Development of acacia mangium bark molded products reinforced with natural acids and non-wood plant fibers

(植物繊維や天然有機酸で補強したプラスチック成形物の開発)

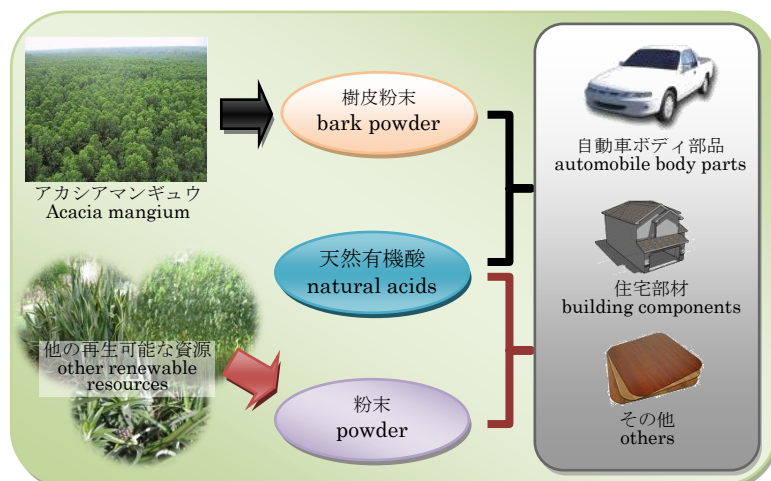
Speaker : Sasa Sofyan Munawar (Mission Researcher, RISH, Kyoto University)

Collaborators : Prof. Shuichi Kawai, Dr. Kenji Umemura

Related Mission : 4 (Development of Technology and Materials for Cyclical Utilization of Bio-based Resources)

Abstract

Bark is the outer part of stems, branches and roots in woody plants, which surrounds wood and makes up 10-15% of the plant's weight. Bark can be obtained from wood processing in paper pulping and fiberboard factories. Recently, the utilization of Acacia mangium bark has been subjected to the production of tannin, an adhesive for wood composites. Unfortunately, usage of tannin as adhesives is still very rare and most of the bark obtained in those industry have been disposed as waste. Production of molded products using renewable resources such as wood, bark and plant fibers may become important to reduce the utilization of un-renewable resources from fossils such as coal and crude oil.



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In this study, acacia mangium bark, natural acid (citric acid and malic acid) and plant fiber are exploited to search the possibility of fabricating materials to molded products. Five kinds of molded products made from (1) acacia bark, (2) plant fiber and citric acid, (3) plant fiber and malic acid, (4) acacia bark and citric acid, and (5) acacia bark and malic acid with various pressing conditions (temperatures : 140~280°C, pressure : 4~12 MPa, time : 5~20 minutes) are produced.

In this attempt, the best values of physical and mechanical properties of molded products were obtained at processing condition of 260~280°C for acacia bark molded, 180~200°C for acacia bark-citric acid molded and 160~180°C for acacia bark-malic acid molded. The morphological and thermal properties of materials and products will be discussed in detail.