2018 年 11月 30 日

# 日本材料学会九州支部特別講演会のお知らせ

金 允海　教授が北九州に来日されるのに合わせ，九州工業大学にて特別講演会を開催致します．皆様，奮ってご参加ください．

記

日時：平成 31 年 1 月 11 日（金）8:50～10:20 （時間は若干変更する場合があります）

場所：九州工業大学工学部 総合教育棟 3階 C-3B講義室

講演者：**Prof. Yun-Hae KIM　(ex-Acting president of Korea Maritime and Ocean University, Vice-president of Korean Society for Composite Materials)**

## 講演題目：Strength Evaluation of Halloysite Nanocomposite Materials under Moisture Absorption and Its Application

As the nanocomposite industry becomes larger and the range of use of ultra-light functional materials increases, uniform dispersion of nanoparticles in nanocomposites is a challenge for nanotechnology. Especially, there is a prominent movement to establish a research foundation for integrated molding technology in the manufacturing process of composite structures, which will contribute to the development of molding methods suitable for high performance large structures and the prevention of risk factors for internal defects in advance. Dispersion stability is the most important factors directly related to product performance in the nano-suspension produced by dispersing mainly nanoparticles in a polymer resin. The main criterion that predominantly determines dispersion stability is the occurrence of intergranular aggregation, which influenced by the Van der Waals force existing between the nanoparticles[1-2]. In other words, securing the dispersion stability of nanoparticles in a viscous fluid such as a polymer resin is ultimately necessary in terms of material design and processing of products utilizing nanomaterials.
Therefore, in this study, glass fiber reinforced plastic (GFRP) and basalt fiber reinforced plastic (BFRP) laminated nanocomposites were manufactured by using halloysite nanotube (HNT) as an additive. The laminate thickness was divided into two types according to the number of layers. They exposed to water environment to confirm the water deterioration phenomenon at the lamination interface and the interfacial bonding characteristics, thereby proving the influence of the HNT dispersion on them. The main results obtained are as follows. In the laminated nanocomposite, the dispersion and bonding properties of the nanoparticles at the interfaces are a major factor closely related to the physical properties of the final product. Nanoparticle aggregation occurs in the process of dispersing nanoparticles in a polymer resin having a viscosity, or a particle re-aggregation phenomenon and a large amount of pores generates in the curing process. In this case, it is necessary to break the physical bonds such as attraction between the initial nanoparticles and achieve a smooth chemical bonding with the polymer resin. In this study, the effect of HNT dispersion on interfacial bonding was compared and analyzed in 70 °C high temperature water environment for 30 days by adding 0.5 wt. % HNT to GFRP and BFRP respectively. As a result, HNT contributed to lowering the moisture absorption rate, which was much larger as the lamination thickness was thinner. Also, the thicker the lamination thickness, the less the HNT re-aggregation phenomenon in the curing process, which showed uniform dispersion in the entire laminate area. Especially, the weight recovery rate for moisture was high in HNT-GF because HNT has a close structural relationship with GF than epoxy resin.

以上

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