Konduktivitas termal komposit sandwich: Dengan skin epoksi bervariasi penguat serat alam dan core poliuretan berpenguat nanoselulosa berbasis daun nanas Subang Jawa Barat = Thermal conductivity of sandwich composites: With epoxy reinforced various natural fibres as skin and polyurethane reinforced Subang pineapple leaf nanocellulose as core

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Abstrak

Green composite merupakan salah satu jenis komposit dengan unsur penyusunnya merupakan bahan alam. Indonesia merupakan negara tropis yang kaya akan keragaman sumber daya alam yang menghasilkan berbagai jenis serat alam salah satunya serat daun nanas dari perkebunan Subang Jawa Barat. Penelitian ini bertujuan untuk memperoleh model konduktivitas termal komposit sandwich dengan core poliuretan/nanoselulosa berbasis serat daun nanas Subang Jawa Barat dan skin epoksi berpenguat variasi serat alam. Pemodelan konduktivitas termal komposit sandwich dibuat menggunakan komputasi Microsoft Excel sederhana. Pemodelan dilakukan berdasarkan persamaan Rule of Mixture dari core dan skin berpenguat variasi serat alam berupa pineapple leaves (PALF), serat tandan kosong kelapa sawit (STKKS), coconut husk (CH), papyrus (PPR), dan corn cob (CC) dengan susunan seri skin-core-skin. Berdasarkan kajian literatur konduktivitas termal penguat dipilih menurut komposisi berat atau volume yang menghasilkan sifat mekanik terbaik yakni 1 wt% core filler dan 40 wt% skin fiber. Hasil terbaik konduktivitas termal komposit sandwich sebesar 17,53 x 10⁻² pada model komposit sandwich dengan skin epoksi berpenguat serat papyrus (PPR) dan core poliuretan berpenguat nanoselulosa (CNF) berbasis serat daun nanas Subang, Jawa Barat. Konduktivitas termal komposit sandwich meningkat 84,89 % dari poliuretan murni dan menurun 11,86 % dari epoksi murni.
<hr>Green composite is one type of composites in which one of the elements is natural resource. Indonesia is a tropical country that rich in diversity of natural resources which produces various types of natural fibres, one of which is pineapple leaf fibre from Subang, West Java. This study aimed to obtain the thermal conductivity of sandwich composites model with polyurethane/nanocellulose based on Subang pineapple leaf fiber in West Java as core and epoxy reinforced with natural fiber variations as skins. The thermal conductivity of sandwich composite model was calculated using a simple computation of Microsoft Excel. Modelling was done by reviewing the equation of the Rule of Mixture of core and skins with the variety of natural fibers in the form of pineapple leaves (PALF), oil palm empty fruit bunches (OPEFB), coconut husk (CH), papyrus (PPR), and corn cob (CC) with a series layer of skin-core-skin. Based on the literature study, the thermal conductivity of the reinforcement was chosen according to the composition of the weight or volume that produces the best mechanical properties i.e 1 wt% core filler and 40 wt% skin fiber. The best result of the thermal conductivity of sandwich composites was 17.53 x 10⁻² W/mK on the composite sandwich model with epoxy reinforced 40 wt% papyrus (PPR) as skin and polyurethane reinforced Subang pineapple leaf nanocellulose as core. The thermal conductivity of sandwich composites increased by 84.89% compared to pristine polyurethane and decreased by 11.86% compared to pristine epoxy.