Conceptual Design of Biocomposites for Automotive Components

ABSTRACT

Recently, biocomposites became highly valuable due to their environmental advantages. The growing environmental awareness of people and the new stringent green policies enacted by governments has intensify the search and development of more environmentally friendly materials to preserve our immediate environment and public health. However, the selection of bio-based materials is quite difficult to perform compared to conventional materials like synthetic fibers and plastics. Hence, the use of computer aided tools for choosing bio-based materials help to minimize material selection errors and accommodates the increasing number of new materials as well as prevents financial and time loss. This review presented a brief insight of biocomposite materials selection using computer aided systems such as expert systems. Multi-criteria decision making models or tools also plays significant role in the evaluation and selection of materials. Numerous factors of various materials such as mechanical properties, material cost, environmental performance, just to name a few, are considered in the material selection process. These factors mostly contradict or even conflict with each other, which further complicates the task. Hence, to alleviate material selection problems and ease out decision making procedures, multi-criteria decision making (MCDM) approach is employed. MCDM is classified into multi attribute decision making (MADM) and multi objective decision making (MODM). MADM is the most common approach utilized for composite material selection purposes. This chapter also discusses about life cycle assessment (LCA) of products which is one of the widely used techniques in analyzing and quantifying the effect of biocomposite products on the surrounding environment during their total life time. Finally, a Case study on material selection of Bio-resin for biocomposites using modified digital logic and weighted property method was presented.

Keywords: Material selection; Biocomposites; Life cycle assessment; Modified digital logic