Voids in biocomposites and their hybrids: origin, effect on moisture absorption, and optical analysis

ABSTRACT

Polymer composite materials are categorized as biocomposites. The classification was made based on the biodegradability of the matrix and the fiber used in the polymer composite material. The rise in demand for biocomposites is related to the rise in awareness about their impact on everyday activity on earth. However, because their material technology is relatively new compared with their synthetic polymer composites, more study and research are being performed to understand and develop a reliable range of biocomposites for applications. One aspect that has influence their properties is the formation of voids, also known as porosity in biocomposites. This chapter reviews the different formations of voids that have were established in research on polymer composite materials and how they relate to the formation of voids in biocomposite polymers. In particular, focus is given to biocomposites with plant-based natural fibers as reinforcement. The review starts with different sources that contribute to the formation of voids, the different types of voids that can form, and the processes that affect this formation. After the discussion of how it forms, the chapter discusses the moisture absorption test in terms of the significance of its results and how its measurements are conducted. Optical analysis is another important method available to produce supplementary data to support and strengthen the discussion on voids. Hence optical analysis is also reviewed and some examples of how the data looks are shown in the later part of the chapter. Finally, the effect of vibration on the formation of voids is reviewed as a possible alternative in the process of reducing voids for biocomposites.

Keyword: Biocomposite; Moisture absorption; Optical analysis; Polymer composite; Vibration; Voids