

Abstract

The present work aims at investigating the effect of locally produced clay (Algeria), along with the effect of their size and rate on physical and mechanical properties of the composite material. This study is divided into two parts: The first one is devoted to the study of the composite material based on epoxy resin with kaolin, using different size fractions at rates ranging from 2% to 20%. The second part examines epoxy resin-based composite with calcined kaolin (metakaolin) with regard to the influence of the structure, the particle size and the charge rate on the properties of the material. It is shown that the clay fillers give the epoxy resin different properties compared to the epoxy resin alone and, additionally, reduce the cost of materials. It was also observed that the fillers enhance the mechanical properties by increasing the rigidity of the material. There is a maximum value of 2.4 GPa to 18% kaolin, or more than 325% increase in the modulus of elasticity with respect to unfilled resin for the finer particle size. It was also found that the modulus of elasticity increases with increasing the loading rate. Indeed, the rigidity increases with increasing the filler rate. Moreover, for both fillers, lower fraction yields better results. Moreover, for both types of added fillers, lower fraction yields better results.