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Effect of soaking time towards graphitization of empty fruit bunch (EFB) waste

Abstract

Empty fruit bunch (EFB) are the second-highest waste produced in the oil palm industry which is 18 022 tonnes in a year. However, the presence of oil palm waste especially from empty fruit bunch (EFB) give a major problem to the disposal. Herein, EFB waste has been identified as a potential carbon source for synthetic graphite production. This is due to implement the lower heating temperature of synthetic graphite produced in controlled heating conditions. Several parameters have been manipulated to study the effect of various parameters on the graphitization process. Hence, in this study, the effect of soaking time towards graphitization of empty fruit bunch (EFB) waste has been investigated. EFB waste was heat treated with various soaking times which is 2 hours, 2.5 hours and 3 hours in controlled heating conditions with constant heating temperature at 500°C and heating rate at 10°/minute After heating treatment, the samples were characterized using X-ray Diffraction (XRD) and analyzed by X'Pert Highscore Plus software. The functional group of synthetic graphite was determined by using Fourier Transform Infrared spectroscopy (FTIR). The morphological study was carried out by using Scanning Electron Microscope (SEM). From the analysis, the best synthetic graphite produced is at the 2.5 hours soaking time with a constant heating temperature at 500°C and a constant heating rate at 10°/min.