IOP Conference Series: Materials Science and Engineering *Open Access* Volume 957, Issue 124 November 2020 Article number 0120312020 International Conference on Sustainable Materials, ICoSM 2020 Pahang, Virtual 3 September 2020 Code 165257

Effect of using Palm Char and Coke as a Reductant in Production of Ferrosilicon

Abstract

This research focused on the synthesis of ferrosilicon alloy by coke and palm char as a reductant. Raw materials which were iron ore, silica sand, coke and palm char mixed and compacted into pellets. The pellets were reduced at temperature of 1300 C using horizontal tube furnace with nitrogen gas flow. The pellets after reduction process were characterized by X-ray fluorescence (XRF), X- ray diffraction (XRD), Scanning electron microscope equipped with energy dispersive spectra (SEM/EDS). The results from XRD analysis indicated that the formation of FeSi, Fe3Si and SiC phases were appeared at 1300 C for both reductants. The brighter phases were observed in SEM/EDS mapping analysis represents as iron and silicon. The EDX analysis showed the high amount silica developed for coke compared to palm char due to high content of silica and carbon. The results found that palm char as carbon reductant has the potential to produce ferrosilicon and silica carbide in sustainable way.