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## Effect of reduction roasting by using bio-char derived from empty fruit bunch on the magnetic properties of Malaysian iron ore (Article)

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### Abstract

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Beneficiation of Malaysian iron ore is becoming necessary as iron resources are depleting. However, the upgrading process is challenging because of the weak magnetic properties of Malaysian iron ore. In this study, bio-char derived from oil palm empty fruit bunch (EFB) was utilized as an energy source for reduction roasting. Mixtures of Malaysian iron ore and the bio-char were pressed into briquettes and subjected to reduction roasting processes at 873-1173 K. The extent of reduction was estimated on the basis of mass loss, and the magnetization of samples was measured using a vibrating sample magnetometer (VSM). When reduced at 873 K, the original goethite-rich ore was converted into hematite. An increase in temperature to 1073 K caused a significant conversion of hematite into magnetite and enhanced the magnetic susceptibility and saturation magnetization of samples. The magnetic properties diminished at 1173 K as the iron ore was partially reduced to wustite. This reduction roasting by using the bio-char can assist in upgrading the iron ore by improving its magnetic properties. © 2014 University of Science and Technology Beijing and Springer-Verlag Berlin Heidelberg.

### Author keywords

bio-char iron ores magnetic properties ore reduction ore roasting

### Indexed keywords

Engineering  
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Reduction roasting  
Vibrating sample magnetometer

Engineering main  
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Iron ore reduction

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