

Determination of Trace Elements in the Ash of Wood and Bamboo charcoal by PIXE Analysis

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Abstract

Heat treatment of both bamboo and wood charcoal at 2000-3000 °C is known to induce changes of their carbon structures into graphite crystals having new properties.

It is also known that transitional metal elements and their oxides together with graphitization catalysts play an active role in the formation of graphite crystals of carbon materials, while graphitizable carbons are formed at relatively low temperatures as 900-1100 °C.

Wood and bamboo charcoals, which are made of biomass, already contain many trace elements that need to be determined to understand the effects of transitional metal elements and their oxides on the graphitization process.

In this study, trace elements in the ash of wood and bamboo charcoals were determined by PIXE analysis. As a result, we determined the characteristic features of each charcoal as follows: wood charcoal ash was found to contain higher Ca and relatively low Mn and Zn, while bamboo charcoal ash contained higher K, Mg and Si and lower Sr.

Our results also showed scant amounts of Fe, Cu and Mn in both charcoals could suggest their minimal role in the graphitization process.