

## 研究論文

## 成形圧力の異なるバイオコークスの物理的・化学的变化に関する研究

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Effects of molding pressures on physical and chemical changes in Bio-coke produced from wood biomass

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This study investigated the effects of molding pressures on the physical and chemical changes in the solid fuel 'Bio-coke'. The Bio-coke samples used in the experiment were produced from two different types of wood biomass, i.e. cedar (*Cryptomeria japonica*) and beech (*Fagus crenata Blume*), under different hot press molding conditions. The physical properties including the apparent density and compressive strength for each sample were measured, and the chemical composition was analyzed. The results indicated that as the molding pressure increased, the apparent density increased and gradually approached the real density, and it finally reached the maximum level at the molding pressure of 30 MPa. The compressive strength also increased with the molding pressure, and the increase became more dramatic after the molding pressure exceeded 20 MPa. On the other hand, the matrix polysaccharide and Klason lignin initially decreased as the molding pressure increased. Meanwhile, the organic compounds in hot-water and organic solvent extracts increased. However, when the molding pressure approached or exceeded 20 MPa, the matrix polysaccharide started to increase due to the degradation of crystalline cellulose. The difference in the physical properties between cedar and beech might have originated from the difference in the content of matrix polysaccharide, which plays an important role in binding crystalline cellulose and Klason lignin.

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