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Characteristic modification of alkalized corn stalk and contribution to the bonding mechanism of fuel briquette

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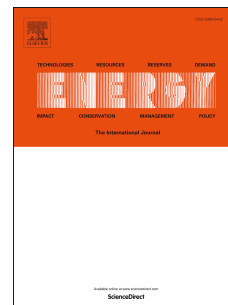
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1 **Characteristic modification of alkalized corn stalk and contribution to the bonding**  
2 **mechanism of fuel briquette**

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5

6 **Abstract**

7 In this paper, corn stalk was alkalized by gradient concentrations of sodium  
8 hydroxide and briquetted with anthracite coal. The bonding mechanism was explored by  
9 a combined analysis of physicochemical, microstructure and mechanical properties.

10 Alkaline treatment had a large effect on decomposing most of lignin and dissolving the  
11 carbohydrates in corn stalk even at a low concentration of 1%. With the increase in  
12 alkaline concentration (for 1%-2%), the degree of decomposition of hemicellulose and  
13 amorphous cellulose increased gradually. When the concentration of alkaline reagent  
14 was higher than 3%, more than 40% of hemicellulose was degraded. A complete surface  
15 structure of a spatial network was achieved when corn stalk was treated by 2% alkaline,  
16 which mainly contributed to the bonding performance of compound briquette. Under  
17 this condition, the ratio of cellulose to hemicellulose to lignin was approximately 7.0:  
18 2.5: 0.5, and it also exhibited a good pyrolysis performance for energy conversion.

19 **Keywords:** Corn stalk; biomass briquette; alkaline treatment; bonding mechanism

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