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## Fast pyrolysis of cotton stalk biomass using calcium oxide

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### Abstract

We herein investigate the various roles of calcium oxide in the pyrolysis of biomass at a variant temperatures. The evolution of pyrolysis products was examined to propose the various roles of Ca at a range of temperatures and CaO addition ratios with cotton stalk on a fixed-bed reactor. We found that upon the addition of CaO, the content of ketones produced increased, while that of acidic compounds decreased. Under similar conditions, the concentration of evolved H<sub>2</sub> and CH<sub>4</sub> increased, while that of CO<sub>2</sub> decreased. Thus, variation in the CaO/biomass (Ca/B) mass ratios and pyrolysis temperatures indicated that CaO could act as a reactant, an absorbent, and a catalyst at Ca/B ratios of <0.2, >0.2, and >0.4, respectively. Moreover, at temperatures >600 °C, the roles of CaO as an absorbent and a reactant were less apparent, while its role as a catalyst was enhanced.

**Keywords:** cotton stalk; fast pyrolysis; CaO.

### 1. Introduction

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