

Thermogravimetric study of napier grass in inert and oxidative atmospheres conditions

ABSTRACT

Since the industrialisation of Malaysia, the energy demand which mainly relied on fossil fuels has risen continuously. Therefore, all parties including the government, academic society and communities have explored alternative fuel resources to improve the reliability and security of energy supply to meet the future energy. In recent years, biomass has been identified as one of the most promising renewable energy resources compared to hydro, solar, wind, etc. It is projected that energy crops could potentially supply around 200-400 EJ/year in Malaysia at a competitive cost by 2050. Perennial grass is one type of energy crop that could address the above mentioned challenge. In this work, Napier grass (NG) is chosen as the subject due to its desirable characteristics (availability, high growth rates, carbon neutrality and high volatility). In order to investigate the feasibility of NG for heat and power application, the thermal decomposition characteristics, reactivity, and kinetic of NG needed were tested via thermogravimetric analysis (TGA) under inert (nitrogen) and air atmosphere conditions, respectively. The results indicated that NG biomass has great potential as sustainable energy fuel source for energy generation via gasification process.

Keyword: Napier grass; Thermogravimetric analysis (TGA); Kinetics; Oxidative atmospheres; Alternative fuel