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Abstract

Biomass is a promising renewable energy source which is available globally, mostly in developing countries where access to clean and affordable energy is a critical problem. Biomass gasification is an interesting technology that can convert biomasses to a more versatile fuel known as syngas, the energy which can substitute conventional fossil fuels in the future. Syngas can amenably be combusted to produce power and heat as well as a feedstock for synthesis of chemicals and other fuels. The biomass gasification is facing severe operational challenges, one of the problems being tar formation and its removal techniques. Tar condenses at reduced temperature, thus causing blockage in the downstream equipment such as compressors and engines. Many studies have considered syngas cleaning by physical removal and thermal cracking unsuitable as they need downstream processing of scrub liquor and utilizes a part of the produced gas in maintaining the thermal cracking temperature, respectively. The utilization of catalysts has been an interesting focus; however, it has not yet been fruitful as many of the developed catalysts deactivate rapidly, and they are expensive or toxic. The motives of the current study are to review tar formation characteristics and trends on catalytic conversion. In addition, the study elucidates the fascinating behaviour of metallic and oxides of the iron-based catalyst under different syngas composition (oxidizing and reducing environments). The behaviours of the iron-based catalyst indicate its fundamental role in developing a catalyst for tar cracking with respect to less toxic, inexpensive, abundant, and regenerable alternatives.

Keywords

Antifungal activity; Physiological and Biochemical tests; RNA-SEQ; ZNO