

Metal free carbon catalyst for methane decomposition under solar energy

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Hydrogen is expecting energy source without any greenhouse gas (GHG) emission, as global warming is regarded as threat to human being. Most methods to produce hydrogen are based on traditional syngas methods, such as Steam Methane Reforming (SMR) and Dry Reforming of Methane (DRM). Emitting GHG is inevitable using those methods. Even though methane is common product in waste disposal sites, around 16% of methane cannot be used. The generated methane is not large enough to imply the methods. Catalytic Methane Decomposition (CMD) is alternative that can recover those problems. CMD directly convert methane into hydrogen and produce carbon which can prevent further GHG emission. Abovementioned methods are endothermic reaction, in other word, high temperature is favorable in order to achieve better conversion. In this context, Carbon is promising material for its thermal stability in anaerobic condition. In this study, variety factors such as BET surface area, crystallinity, and chemical compounds of carbon was investigated. Methane conversion at 1000°C reached from 18 to 38% with 99% hydrogen selectivity.