PHOTOELECTROCHEMICAL PERFORMANCE OF g-C_3N_4 FOR HYDROGEN PRODUCTION

Thurga Devi Munusamy, Chin Sim Yee and Md. Maksudur Rahman Khan
Department of Chemical Engineering, College of Engineering
Universiti Malaysia Pahang
mrkhancep@yahoo.com

Abstract— Global energy crisis keeps arising and converting intermittent energies into storable chemical fuels, especially hydrogen is indeed a crucial obligation. Water splitting through photoelectrochemical (PEC) is certainly a promising technology intended for the current dilemma. Nevertheless, the broad applications of this system mainly depends on the exploration of efficient electrode materials. Accordingly, graphitic carbon nitride (g-C_3N_4) has high potentiality as a photoelectrode material for PEC water splitting. In the present work, g-C_3N_4 was fabricated by thermal polycondensation technique and characterised by numerous analysis techniques, including XRD, FTIR, UV-Vis and Mott-Schottky. The hydrogen evolution was deliberated by electrochemical analysis in the three-electrode PEC system. LSV analysis revealed that during the light irradiation, the current generated was higher (0.45 mA/cm_2), whereby the current density represents the amount of hydrogen gas evolved.

Keywords— Photoelectrochemical; Photoelectrode; g-C_3N_4; Visible light; Hydrogen

1. INTRODUCTION

In the current era, owing to industrial development and population expansion, worldwide energy demand was drastically increased and estimated to be doubled by the year 2050. Additionally, since the energy crisis and environmental deterioration are apparently elevating, the production of clean and renewable energy has become a major task to mankind to tackle the arising issues. Accordingly, hydrogen, as a sustainable energy carrier, could be a life-saving source that possesses many advantages, including clean energy that is free from pollution, has high energy density (140 MJ/kg), is able to be reserved for long-term