Global

Study on the novel electronic properties of graphite carbonitride (gCN) film

Go Sian Huai
Assistant Professor(SA), Dr. Eng.
Email : gosian@gifu-nct.ac.jp

Research Fields Semiconductor materials, gCN

Keywords Keyword1, Keyword2, Keyword3

Research Outline

Theme 1

Solar panels are electrical devices made from semiconductor materials such as silicon and they can convert sunlight into electricity. However, solar panels reduce their electrical efficiency performances with time due to device level degradation. This phenomenon is called potential-induced degradation PID. My research was to investigate the recovery method to solve that problems.

Luckily, the power supply structure of solar panel is same as battery with positive and negative terminals. From that point, I got an idea to apply DC voltages in reverse direction to solar panels directly. Reverse direction means switching the terminal polarity and I used voltage from -12 to -17 V for 10 minutes in my experiment.

Amazingly, this simple method can recover electrical efficiency performances up to 85% from 20% PID affected condition. In addition, it is also safe compared to previous method that use very high voltages and high temperature.

From this research, I learnt about the basic physical properties of semiconductors, basic synthesis process such as sputtering and vapor deposition methos. I believe that I can apply these knowledges to other semiconductor materials.

Theme2

Recently, graphitic carbon nitride (gCN) has attracted considerable attention due to its attractive features including excellent electrochemical performance, suitable band gap, nontoxicity, and high mechanical and thermal stability.

Currently, I am working as a specially appointed assistant professor in National Institute of Technology, Gifu College. My task is mainly related to global activities. I chose to do research on gCN when I arrived to Gifu College. There are two main research objectives for this academic year.

1. To clarify the electrical conductivity and optical properties of gCN films.

2. To discover the novelty of the electrical and physical properties of gCN films.

It is great pleasure if we can contribute the education and development of local society through the research activities, and express our achievements toward the world from Gifu, Japan.