EFFECT OF IODINE INCORPORATION TO THE ELECTRICAL PROPERTIES OF AMORPHOUS CARBON THIN FILMS

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ABSTRACT

Amorphous carbon (a-C) thin films were deposited on glass and silicon substrates by thermal chemical vapor deposition (CVD) technique using camphor oil as the precursor. After deposited the a-C thin films, the iodine (I) was doped on the a-C thin films using the same technique of deposition of a-C thin film. All the samples were grown in fixed conditions except the doping temperature parameter was varied. The effect of doping temperature in the a-C and a-C:I thin films on electrical, structural and optical properties was characterized by using a standard two-probe method using BUKOH KEIKI (CEP-2000) Solar simulator/Spectral sensitivity Measurement, RAMAN spectroscopy and UV-Vis-NIR spectroscopy respectively. The conductivity of a-C:I thin films increased to 7.44 x 10^{-3} S.cm^{-1} with the doping temperature up to 450^{o}C and it shows photoresponse is 1.063 at doping temperature 450^{o}C. The UV-Vis-NIR analysis was used to obtain the optical absorption coefficient and optical band gap. The absorption coefficient at sample 450^{o}C increase from 8763 cm^{-1} to 39292 cm^{-1} and the optical band gap decrease from 0.33eV to 0.08eV. The RAMAN scattering analysis was used to prove the amorphous structure of a-C and a-C:I thin films and it revealed at D-peak (1340 cm^{-1}) and G-peak (1590 cm^{-1}).

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Carbon is the first element in group 14 in periodic table. Carbon is an attractive material in a variety of stable forms such as graphite, diamond, nanotubes and fullerenes [1]. Figure 1.1 shows the type of carbon.

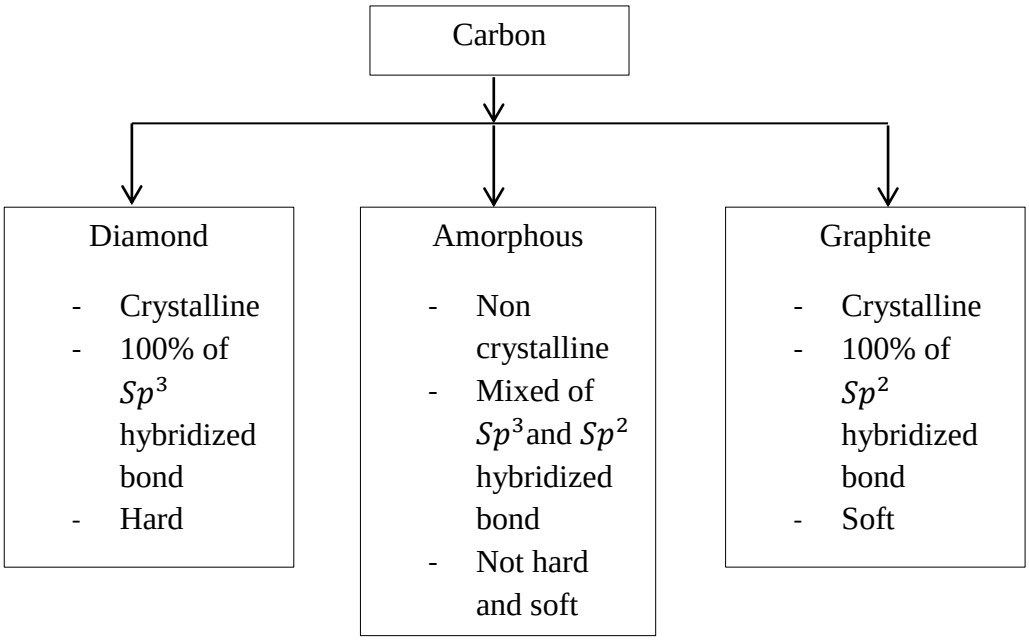

Figure 1.1: Type of Carbon