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Towards innovated green nanotechnology material: Ultrananocrystalline diamond/hydrogenated amorphous carbon films prepared by pulsed laser deposition

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Ultrananocrystalline diamond/hydrogenated amorphous carbon (UNCD/a-C:H) films are commonly prepared by chemical vapour deposition (CVD) technique. Although it can be grown in an atmosphere including no hydrogen gas, the hydrogen from a hydrocarbon source gas can influence the properties of the film. The hydrogen has important roles on the physical properties of the films; however it has never been studied in details thus far. We have reported that nonhydrogenated amorphous carbon (a-C) films containing no diamond grains are grown without ambient gas by pulsed laser deposition (PLD). On the other hand, in this work the growth of film. The chemical bonding structures, the electrical, and the optical properties of the films were investigated in details using several techniques. The films were deposited on silicon and quartz substrates in hydrogen atmospheres by PLD using a graphite target. The preparation conditions were similar to those in our previous works. The films were studied using several techniques. The carrier density was calculated using electron spin resonance (ESR). For the first to our knowledge, non-commercial standard sample was prepared and used to calibrate and quantify the measurements. The standard sample shows a strong stability and it is considered to be competitive to the commercial samples. The ESR investigation was performed at different temperatures. The estimated spin density is relatively high for an insulator UNCD/a-C:H composite film. From the obtained results, it is found that ESR is a promising method to study paramagnetic centers and their interaction with hydrogen for films.

Biography

Sausan Al-Riyami has completed her degree in Physics with minor in Geology in 2007 from SQU, Master's degree of Science & Engineering with honor (IGSES Awards) and her Doctorate of Science in Applied Science for Electronics & Materials in 2013 from Kyushu University. She was Guest Researcher at Institute for Materials Research, Belgium. She was at GUTech before she joined the Research Council in Oman as Renewable Energy Researcher in 2015. Her recent research focus is on both Nanotechnology and Renewable Energy. She received many outstanding awards and research fund grants. She has 20 publications to her credit and serves as Scientific Reviewer in reputed journals.

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