平成 28 年度 第４回 VBL セミナー

4th VBL Seminar, 2016

日時：平成２９年１月２４日（火）１６時３０分～１８時００分

場所：工学部 3 号館２階 応用物理会議室(274 号室)

講師：Dr. Risa Suryana (VBL 客員准教授、Sebelas Maret 大学、Indonesia)

題目：Growth of SiC on Si Substrates and Modification of TiO_2 Layers on FTO Substrates

Abstract:
This presentation reports our research that consists of two parts. First, interaction of Si(111) surface with saturated hydrocarbon gases to obtain SiC. Second, modification of TiO_2 layers on FTO substrate and its application in dye-sensitized solar cell (DSSC).

Deposition of each CH_4 and C_2H_6 gases on Si(111)-7×7 surface and co-deposition of Si and CH_4 gas on Si(111)-7×7 surface at different temperatures are investigated by reflection high-energy electron diffraction (RHEED), quadrupole mass spectroscopy (QMS), scanning electron microscopy (SEM) and atomic force microscopy (AFM). The RHEED patterns during CH_4 or C_2H_6 exposure indicate the evolution of structures such as δ-7×7, 1×1, √3×√3 and SiC at temperatures from RT up to 800^{o}C. Meanwhile, these patterns do not appear in co-deposition of Si and CH_4 gas. The amount of CH_3 molecules plays a role in structure evolution of Si(111) surfaces. Correlating SEM and AFM images, step modification of Si(111) surfaces will be discussed.

Modification of TiO_2 layer on fluorine-doped tin oxide (FTO) substrate has been performed in formation of nanorods and nanofibers. TiO_2 nanorods are synthesized through sol-gel method via anodic alumina membrane (AMM) as template. Meanwhile, TiO_2 nanofibers are synthesized using electrospinning method. AFM images confirmed that TiO_2 nanorods and TiO_2 nanofibers have diameter in range 18-30 nm and 100-1000 nm, respectively. TiO_2 nanorods and nanofibers layer are applied in DSSC. TiO_2 nanorods and nanofibers could increase the DSSC performance compared to use of TiO_2 nanoparticles only. It is considered that TiO_2 nanorods and nanofibers can be effective in photon trapping thus many photons interact to dyes to produce many excited-electrons.

問合せ先：
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