Seminar Announcement

Ass. Prof. Wataru Kada

Department of Electronics, Graduate School of Engineering, Gunma University (J)

Development of CVD diamond membrane ionized-radiation detector with embedded living-cell cultivation environment

Monday, 15 May 2017, h. 15.00

Sala Wataghin, Physics Department, via P. Giuria 1, Torino

The speaker

Ass. Prof. Wataru Kada

2013-present: Assistant Professor, Division of Electronics and Informatics, Faculty of Science and Technology, Gunma, University, Japan

2010–2013: Post-Doctoral Fellow, Japan Atomic Energy Agency (JAEA)

2008–2010: Young Scientist Research Fellow of Japan Society of Promoting Science (DC2)

Related Awards: Young Scientist Presentation Award, Japan Society of Applied Physics, Best Poster Award, 9th International Conference of New Diamond and Nano-Carbon

Summary

Diamond has excellent electrical properties for utilization as radiation detector and at the same time, it equips good biological convertibility. So it could be possible to integrate cell cultivation environment into electrical devices like radiation detectors, where direct observation of the radiation effects are accomplished in neighborhood of living cells. In this studies, we examined cell attachment and growth on a chemical vapor deposition (CVD) diamond membrane, which originally designed as radiation detector. Since cell growth rate on diamond was comparable with general cell dishes, further evaluation of the detector response are required for this diamond membrane at cell adhesive conditions to proof the possibility of these device-complex.

Fig.1 shows a schematic of the diamond membrane detector with cell cultivation environment. By reactive ion etching (RIE), a cavity structure was formed on CVD diamond film (3 mm × 3 mm, with thickness of approximately 30 μm). Both sides of diamond film were coated by Al film then a part of the film attached to the cavity was removed for cell cultivation. A PCB chip with a hole for cell injection were attached on top side of the diamond. Human glioblastoma LN18 cells were cultured at 37°C and 5% CO_2 in Eagle's minimal essential medium containing 10% fetal calf serum, 1% L-glutamine, and 1% penicillin. The LN18 cells were inoculated into the membrane cavity through the hole on PCB. Then diamond was exposed with 5.5 MeV α particles from ^{241}Am. Radiation-induced signals were collected through electrode formed at bottom side of diamond membrane.

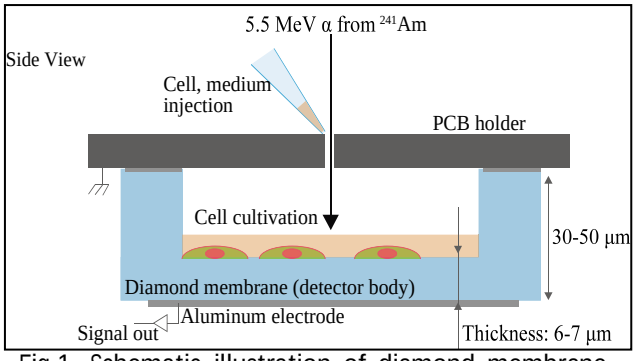

Fig.1. Schematic illustration of diamond membrane with cell cultivation condition.

Acknowledgement: A part of this work was partially supported by MEXT/JSPS Grant-in-aid JP26600139.

Ref. Ettore Vittone