Must be typed

（For JSPS Fellow）

Form B-5

Date（日付）
19/10/2015 （Date/Month/Year：日/月/年）

Activity Report -Science Dialogue Program-
（サイエンス・ダイアログ事業　実施報告書）

- Fellow's name TRAORE Aboulaye（ID No. P 15725 ）

- Participating school（学校名）: **Ichikawa Gakuen Ichikawa Senior High School (Chiba)**

- Date **13/10/2015**（Date/Month/Year:日/月/年）

- Lecture title（講演題目）:（in English） **Diamond Semiconductor**

（in Japanese）

- Lecture summary（講演概要）: Please summary your lecture 200-500 words.

Energy is a crucial resource in our modern societies where economic development and modernization are the main concerns. Besides its necessity in industry as well as in services in order to ensure human well-being such as transport, telecommunications, heating, energy is essential to produce vital resources such as clean water or to guarantee healthcare. Several primary sources gas, oil, coal, uranium (nuclear) available on our planet, are basically transformed into electricity which is the energy source for industry as well as for household and office appliances (refrigeration, lighting, air conditioners, computers, fax, etc.).

Moreover, it is well known that the electricity processing from source transformation (coal, fuels, gas, renewable) to the end-users (household, office, industry, etc) through power conversion systems using the well-established silicon technologies, are in major part responsible for approximately 80% of the energy lost along the chain from primary sources to end-users.

Over the last decades, wide band gap semiconductors (Gallium Nitride GaN, Silicon Carbide SiC, and Diamond) which offer better electrical properties, have been identified as the appropriate materials to overcome silicon limitations and thus, to improve the efficiency of the electrical systems by minimizing losses. The transition from silicon to gallium nitride (GaN) and silicon carbide (SiC) devices in power conversion systems, has been already ignited.

Diamond, the ultimate semiconductor for energy conversion systems, still at the Research & Development stage, is intensively investigated by several research groups over the world. Over the last 20 years, the technological progress achieved in diamond growth & doping, and its surface treatment, allows today to fabricate various electronics devices (Schottky diode, field effect transistors, bipolar transistors, Metal Oxide

Semiconductor capacitor, PIN diodes, etc). Nevertheless, these devices still suffer from several imperfections that must be corrected in order to surpass GaN and SiC-based devices (the main wide bandgap material industrialized today) and making the most of the superior electrical and thermal properties of diamond.

My research activities attempt to contribute to this effort by investigating and enhancing the electrical performance of diamond devices. These activities cover a wide field, ranging from solid state physics, diamond growth, devices technologies investigation using TCAD (Technology Computer Aided Design) simulators, devices fabrication to characterization.

- Language used（使用言語）: **English**

- Lecture format（講演形式）: Power point presentation and experiment

◆Lecture time（講演時間） **140 min**（分）, Q&A time（質疑応答時間） **included in lecture time min**（分）

◆Lecture style（ex.: used projector, conducted experiments）
（講演方法（例：プロジェクター使用による講演、実験・実習の有無など））
Power point presentation and experiment

◆Interpretation（ex.: assistance by accompanied person, provided Japanese explanation by yourself）（通訳（例：同行者によるサポート、講師本人による日本語説明））
Janpanese explanation was given by accompanied person

◆Name and title of accompanied person（同行者 職・氏名）
Prof. Satoshi YAMASAKI

◆Other note worthy information（その他特筆すべき事項）:

- Impressions and opinions from accompanied person（同行者の方から、本事業に対する意見・感想等がありましたら、お願いいたします。）: