Masayoshi Tonouchi, J Material Sci Eng 2014, 3:3
http://dx.doi.org/10.4172/2169-0022.S1.014

OMICS Group Conferences
Accelerating Scientific Discovery

3rd International Conference and Exhibition on
Materials Science & Engineering
October 06-08, 2014 Hilton San Antonio Airport, USA

Gas molecules absorption to graphene studied by laser terahertz emission microscope

Masayoshi Tonouchi
Osaka University, Japan

Laser terahertz (THz) emission microscope (LTEM) is a unique imaging system which provides two-dimensional (2-D) map of the THz pulse emission from a variety of electric materials and devices. LTEM directly reflects local dynamics of optically excited carriers followed by their ultrafast spatial displacement. In the present work, we apply LTEM to study gas absorption to graphene. It is well known that electrical and optical properties of graphene are affected by the adsorption of gas molecules. We fabricate THz emission plate by coating graphene on semi-insulating InP wafers, and observe the THz emission upon femtosecond optical pulse illumination. It is found that the emission waveforms strongly depend on both atmosphere and laser illumination. The results suggest that the oxygen absorption to the graphene together with water vapor changes surface depletion-layer potential of InP resulting in the change of the waveforms. Moreover, we found that UV light illumination enhances the oxidization of graphene and strongly affects the THz emission waveforms. One can visualize the 2-D map of oxidization of the graphene by LTEM, and, since the changes in waveforms are sensitive to it, expect to develop sensitive, noncontact, and nondestructive environmental gas sensor.

Biography

Masayoshi Tonouchi received his Doctorate of Engineering. degree from Osaka University, Japan, in 1988. Since 2000, he is a Professor in Institute of Laser Engineering, Osaka University. His current research interests include ultrafast optical and terahertz science of new functional materials, and development-and-applications of terahertz systems such as the laser terahertz emission microscope. He is a member of the Optical Society of America, the Japan Society of Applied Physics, the Physical Society of Japan, and the Institute of Electronics, Information and Communication Engineers.

tonoouchi@ile.osaka-u.ac.jp