Masayoshi Tonouchi, J Nanomed Nanotechnol 2015, 6:4
http://dx.doi.org/10.4172/2157-7439.S1.021

OMICS International
conferenceseries.com

Nanotechnology Congress & Expo

August 11-13, 2015 Frankfurt, Germany

Introduction to terahertz nanoscience

Masayoshi Tonouchi
Osaka University, Japan

Recent progress on terahertz (THz) science and technology attracts much attention to scientists in broad area but also to the general public for new applications. THz waves covers around from 300GHz to 30THz in frequency, which corresponds to 10 μm to 1 mm in wavelength. The values are vastly larger than nanoscales. Nevertheless, we've been proposing to create new scientific field as terahertz nanoscience. This is because the links between THz science and nanoscience are so strong. Examples are THz quantum cascade lasers (QCLs), ultrafast carrier dynamics in solids, hydration dynamics in biomolecules and medicines, and so on. THz QCLs are strong THz source and made of multiple layers of quantum wells viz. nanostructure. Various kinds of carrier scattering times in solid state for electronics application distributes from several ten femtoseconds to a few picoseconds whereas 1 THz corresponds to 1 ps. Hydration time to some molecules are also in similar time scales. Typical energy for intermolecular interaction of large molecules lies in the range of meV, which also corresponds to THz region. In the present work, we give an overview of THz nanoscience and recent progress of our own research such as laser THz emission microscope.

Biography

Masayoshi Tonouchi received the Dr. E. degrees form Osaka University in 1988. From 1988 to 1996 he worked at Osaka University, Kyushu Institute of Technology, Communications Research Laboratory. From 2000, he has been a Professor of Osaka University and a concurrent Professor of Nanjing University since 2005. His current research interests include ultrafast optical and terahertz science of strongly correlated electron systems, optical interfaces for single-flux-quantum circuits, 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, and the Physical Society of Japan.

tonouchi@ile.osaka-u.ac.jp

Notes: