Bi-Hsuan Lin, Res. Rev. J Mat. Sci. 2017
DOI: 10.4172/2321-6212-C1-002

Temperature-dependent hard X-ray excited optical luminescence to study the optical properties of the ZnO microwires

Bi-Hsuan Lin
National Synchrotron Radiation Research Center, China

The advantages of using synchrotron radiation as the excitation source are that the tunable X-ray energy allows the preferential excitation of the elements through the X-ray absorption edges, and a suitable time structure of the synchrotron can be used to study the dynamics of luminescence of the materials. We developed the synchrotron based hard X-ray excited optical luminescence (XEOL) and time-resolved X-ray excited optical luminescence (TR-XEOL) at the X-ray Nanoprobe (XNP) facility at Taiwan Photon Source (TPS). In parallel to the construction of the XNP endstation, demonstrative XEOL experiments were conducted by unfocused X-ray beam at Taiwan Light Source (TLS). The low temperature (4.2K) and temperature-dependent XEOL with X-ray excited energy below, at and above the Zn K-edge (9.659 keV) were used to obtain the further information of the optical mechanisms of the ZnO microwires. The temperature-dependent XEOL behavior of the ZnO microwires with X-ray energy at 9.67 keV was shown in Figure 1. The free A excitons, donor bound excitons and their phonon replicas can be seen unambiguously at low temperatures. The design of the XEOL and TR-XEOL at XNP and the demonstrative experimental results will be reported.

Biography

Bi-Hsuan Lin has completed his PhD from Department of Photonics and Institute of Electro-Optical Engineering, National Chiao Tung University, Hsinchu, Taiwan and Post-doctoral studies from European Synchrotron Radiation Facility (ESRF) for one year. Currently, he works at National Synchrotron Radiation Research Center as the Assistant Research Scientist. He is participating in the construction and commission of the X-ray nanoprobe beamlime at Taiwan Photo Source (TPS), and is responsible for development of the XEOL and TR-XEOL.

bihsuan@nsrrc.org.tw

Notes: