

Type I CdSe and CdMgSe Quantum Wells

R. Rudniewski, J-G. Rousset, E. Janik, P. Kossacki, A. Golnik, M. Nawrocki,
W. Pacuski

*Institute of Experimental Physics, Faculty of Physics, University of Warsaw,
ul. Hoża 69, 02-681 Warsaw, Poland*

Our goal was to obtain efficient yellow light quantum well (QW) emitter which can be used in ZnTe based microcavities. Therefore we decided to develop type I quantum wells which are almost lattice matched to ZnTe. We grew series of structures using molecular beam epitaxy (MBE) on GaAs substrates. During the growth the samples were characterized in-situ using white light reflectometry, which was used to calculate growth rate and thickness of the layers. Reflection high energy electron diffraction (RHEED) was used to evaluate smoothness of built layer.

We present optical characterization and growth series of CdSe/Cd₈₈Mg₁₂Se and Cd₈₈Mg₁₂Se/Cd₈₅Mg₁₅Se QWs with thickness from 1 to 20 nm. To obtain different concentration of magnesium we used two sources during the growth. Photoluminescence study at temperature of 7K reveal possibility to tune up this structure to emit light in the range of 600 to 710 nm according to thickness and composition of QW. Moreover we found that 5 nm CdSe/Cd₈₈Mg₁₂Se shows the strongest PL peak and sharp (25 meV FWHM) [1]. The concentration of magnesium was calculated thanks to observation of band gap energy of 300 nm CdMgSe layers, which were compared to literature data [2].

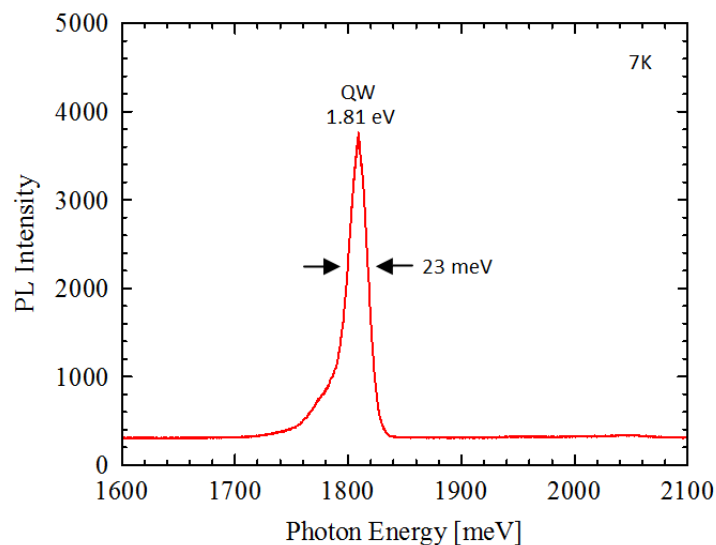


Fig1. PL spectrum of the 5 nm CdSe/Cd₈₈Mg₁₂Se QW measured at 7K.

- [1] Y.M. Park, R. Andre, J. Kasprzak, Le Si Dang, E. Bellet-Amalric, *Applied Surface Science* 253 (2007).
- [2] F. Firszt, S. Łęgowski, H. Męczyńska, J. Szatkowski, W. Paszkowicz, M. Marczak, *Journal of Crystal Growth* 184/185 (1998).