

k is the length of the wave-vector of the photoelectrons depending on the difference $E-E_K$ (E_K is the energy of the absorption edge) Figure 3 presents the extended oscillation contribution $k^2\chi''(k)$ extracted from the raw DAFS spectra.

Then, the DAFS oscillation were transformed to direct (R)-space (Fig. 4) in order to obtain the local environment of the Se atoms, as well as the Cd concentration and atomic ordering in different iso-strain volumes of the quantum dots. The first peak signed (first coordination shell) as 1 at the Fourier transform (FT) that contain mixed Cd and Zn atoms at the position h_1 is shifted to low R . From that we can conclude that at this case the first coordination shell is dominated by Zn atoms and the distance tends to the Se-Zn. This results was expected since the h_1 -value was chosen close to the ZnSe substrate. The h_2 position corresponds to the volume of CdSe QDs. The concentration of Cd is higher than Zn atoms. A significant change at the second coordination shell from which the Se atoms contribute are not expected.

DAFS experiments were combined with EXAFS measurements at the CdK absorption edge, performed at the beamline BM08 (see report HS359).

The results achieved from the DAFS and EXAFS analysis represent a valuable contribution to the understanding of the structure of CdSe/ZnSe/MgS and CdTe/ZnTe systems. They will help to optimise the growth process in order to obtain the quantum dots-based devices with the best optical properties.

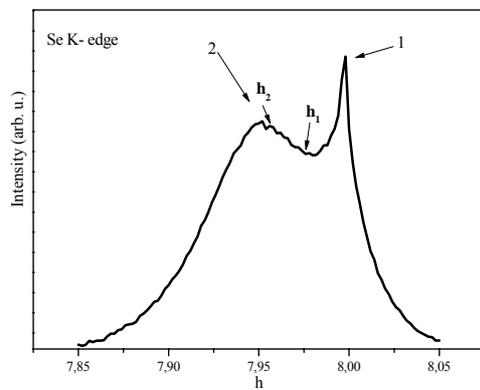


Fig. 1 Diffraction profile in radial (800) direction. 1- ZnSe substrate; 2- the CdSe quantum dots. The DAFS data were collected at the position indicated by h_1 and h_2 .

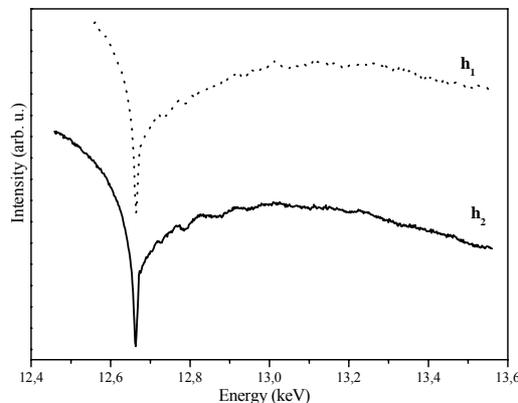


Fig. 2. Raw DAFS spectra collected at two different value of h , namely $h_1=7.999$, $h_2=7.975$.

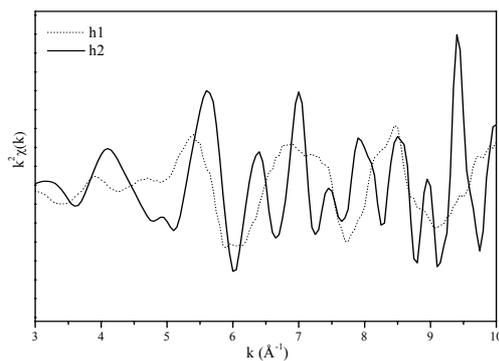


Fig. 3 The oscillation $k^2\chi''(k)$ extracted from DAFS data shown on the fig. 2 for two different value of h .

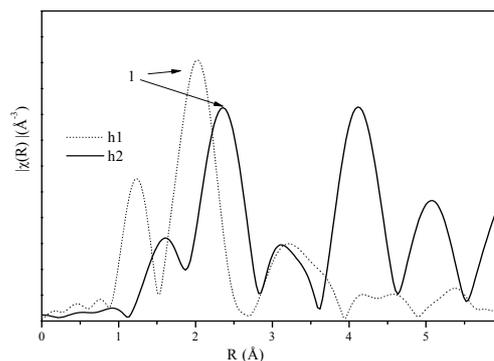


Fig. 4 The magnitude of the Fourier transform of the oscillation presented on the fig. 3

Referenece:

- [1] S. Grenier, A. Letoublon, M. G. Proietti, H. Renevier, L. Gonzalez, J. M. Garcia, C. Priester, and J. Garcia, Nucl. Instr. Meth. in Phys. Res. B 200, (2003) 24.
- [2] A. Gust, C. Kruse, K. Sebald, H. Lohmeyer, J. Gutowski, and D. Hommel, phys. stat. sol. (c) 4 (2006) 767.
- [3] M. G. Proietti et al., Phys. Rev. B 59, 5479 (1999); J. O. Cross, *Ph.D. thesis*, University of Washington, Seattle (1996); J. Coraux et al., Phys. Rev. B 75, 235312 (2007);