Eur. Phys. J. B (2012) 85: 91
DOI: 10.1140/epjb/e2012-30089-y

THE EUROPEAN PHYSICAL JOURNAL B

Erratum

Erratum

Magnetic and transport properties of transition-metal implanted ZnO single crystals

R.P. Borges[1,a], B. Ribeiro[1], A.R.G. Costa[1], C. Silva[1], R.C. da Silva[3,4], G. Evans[1,2], A.P. Gonçalves[1,5], M.M. Cruz[1,2], M. Godinho[1,2], and U. Wahl[3,4]

[1] Centro de Física da Matéria Condensada da Universidade de Lisboa, Campo Grande, Ed. C8, 1749-016 Lisboa, Portugal
[2] Departamento de Física, Faculdade de Ciências, Universidade de Lisboa, Campo Grande, Ed. C8, 1749-016 Lisboa, Portugal
[3] Laboratório de Feixe de Iões, Dep. Física, Instituto Tecnológico e Nuclear, Estrada Nacional 10, 2686-953 Sacavém, Portugal
[4] Centro de Física Nuclear da Universidade de Lisboa, Av. Prof. Gama Pinto 2, 1649-003 Lisboa, Portugal
[5] Instituto Tecnológico e Nuclear, Departamento de Química, 2686-953 Sacavém, Portugal

Eur. Phys. J. B **79**, 185 (2011)

Received 31 January 2012
Published online 7 March 2012 –

In the original publication [1] some essential facts regarding the implantation conditions were missing. These points are now addressed and Wahl, who was responsible for the implantations, has been included as a co-author.

All ZnO samples were implanted along the surface normal under [0001] channeling conditions. This was chosen in order to maximize the range of the implanted transition metals (TMs) using the maximum energy of 200 keV available at the implanter and consequently achieving a smaller peak concentration of TMs than for random implantation (which typically is performed under an angle of 7−10° to the surface direction). The consequences are as follows:

(a) The TM depth profiles derived from the RBS/C spectra of the 1×10^{17} cm^{-2} implanted samples (Fig. 1 in [1]) are centered around 1600−1800 Å with a straggling around 700−800 Å. The measured profiles are therefore centered ∼1.8−1.9 times deeper in the sample and are also around twice as wide as would be expected for low-fluence random implantation while the peak Mn concentration is ∼5% only, a factor ∼2 lower than expected for random implantation and neglecting sputtering.
(b) The implantation damage is reduced significantly. This was e.g. demonstrated in the case of Er implantation into GaN [2,3] and Eu into AlN [4], materials that are similar to ZnO with respect to the creation of implantation damage.
(c) The sputter yield during implantation is reduced significantly as well. This has been observed in other cases described in the literature, e.g. [5–7].

Summarizing, it seems important to point out that repeating the described experiments by using non-channeling geometry for the implantations, one would get different results.

We acknowledge the help of J. Rocha who operated the ion implanter.

References

1. R.P. Borges, B. Ribeiro, A.R.G. Costa, C. Silva, R.C. da Silva, G. Evans, A.P. Gonçalves, M.M. Cruz, M. Godinho, Eur. Phys. J. B **79**, 185 (2011)
2. J. Nord, K. Nordlund, B. Pipeleers, A. Vantomme, Mater. Sci. Eng. B **105**, 111 (2003)
3. B. Pipeleers, S.M. Hogg, A. Vantomme, J. Appl. Phys. **98**, 123504 (2005)
4. K. Lorenz, E. Alves, F. Gloux, P. Ruterana, M. Peres, A.J. Neves, T. Monteiro, J. Appl. Phys. **107**, 023525 (2010)
5. R.J. MacDonald, Adv. Phys. **19**, 457 (1970)
6. A. Vantomme, M.F. Wu, U. Wahl, J. De Wachter, S. Degroote, H. Pattyn, G. Langouche, H. Bender, Nucl. Instr. Methods B **120**, 190 (1996)
7. Y. Stark, R. Frömter, D. Stickler, H.P. Oepen, J. Appl. Phys. **105**, 103542 (2009)

[a] e-mail: rpborges@fc.ul.pt