

On growth mechanisms and dynamic simulation of growth process based on the experimental results of nanowire growth by VLS method on semiconductor substrates

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Abstract: Recently the production of nanowires is attracting many scientists but it also holds many challenges. Many problems including growth mechanisms are still not understood clearly. This paper will show briefly some our experiment results of nanowires (GeO₂ and Ga₂O₃) growth by VLS, the rest of the paper will discuss nanowire growth mechanisms and then showing a developed programme on PC for dynamic simulation of nanowire growth process. This running simulation software for nanowires growth process has contained main mechanisms and we can see directly some physical phenomena concerning growth process by VLS method. © 2009 IOP Publishing Ltd.

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References:

1. Patently, M.J., Nano materials - The driving force (2004) Nanotoday, 7 (12), p. 20
2. Roco, (2002) Small Wonders, p. 1
3. Bhushan, B., (2004) Handbook of Nanotechnology, p. 99
4. Yang, P., Wu, Y., Fan, R., (2002) Int. J. Nanoscience, 1 (1), p. 1
5. Lauhon, L.J., Gudiksen, M.S., Lieber, C.M., (2004) Phil. Trans. R. Soc. Lond., 362 (1819), p. 1247
6. Huang, Y., Xiangfeng, Cui, Y., Mlieber, C., (2002) Nano Lett., 2 (2), p. 101
7. Greytak, A.B., Lauhon, L.J., Gudiksen, M.S., Lieber, C.M., (2004) Appl. Phys. Lett., 84, p. 24
8. Atashbar, M.Z., Yu, M.-F., Chen, X., (2002) Investigation and Characterization of Ga₂O₃ Nanowire for Gas Sensing Applications
9. Tuan, P.A., An, D.K., Manh, D.H., Phong, P.V., Hoa, L.T., (2007), p. 359Trang, P.H., Vuong, H.V., Phong, P.V., Manh, N.H., An, D.K., (2008), p. 975Mojzes, I., Kokényesi, S., Szabó, I.A., Ivan, I., Pécz, B., (2006) Nanopages, 1 (1), p. 85
10. Hemant, A., Ann, M.F., Irene, A.G., Christopher, E.D.C., Paul, C., (2007) ACS Nano., 1 (5), p. 415
11. Civale, Y., Nanver, L.K., Hadley, P., (2004), p. 692Noborisaka, J., Motohisa, J., Hara, S., Fukui, T., (2005) Appl. Phys. Lett., 87 (9), p. 093109
12. Wen, J.G., Lao, J.Y., Wang, D.Z., Kyaw, T.M., Foo, Y.L., Ren, Z.F., (2003) Chem. Phys. Lett., 372 (5-6), p. 717
13. Kalache, B., Cabarraocas, P.R., Morral, A.F., (2006) Japan. J. Appl. Phys., 45 (7), p. 190
14. Verheijen, M.A., Immink, G., De, S.T., Borgstrom, M.T., Bakkers, E.P., Growth kinetics of heterostructured GaP-GaAs nanowires (2006) J. Am. Chem. Soc., 128 (4), p. 1353
15. Chiem, C.V., Ha, N.T.T., Tam, N.T.T., Chuc, N.V., Li, H., Muyng, S.J., (2008), p. 837An, D.K., Chung, N.X., Tuan, P.A., (2008), p. 518