

Structural properties of P-doped ZnO

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Abstract: P was doped into ZnO in two forms: ceramics; and nano-wires fabricated by thermal evaporation technique. When P concentration is below 6%, the compounds could be p-type with the hole concentration is of about $10^{18}/\text{cm}^3$. However, this property could be lost after few weeks due to aging effect. When the P concentration is above 9%, peaks of P appear clearly in the X-ray spectra, and simultaneously, the compounds are found to be n-type. The size of grains in ceramic samples strongly depends on deposition conditions. As for wires, changing the substrate temperature and the pressure of gas flow could vary the size. The smallest size of P-doped ZnO wires that could be obtained is about 10 nm for the composition of doping with 3% of P. © 2010 Elsevier B.V. All rights reserved.

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References:

- Lu, J.G., Zhang, Y.Z., Ye, Z.Z., Zhu, L.P., Zhao, B.H., Liang, Q.L., (2006) Appl. Phys. Lett., 88, p. 222114
- Vaithianathan, V., Lee, B.T., Chang, C.H., Asokan, K., Kim, S.S., (2006) Appl. Phys. Lett., 88, p. 112103
- Dietl, T., Ohno, H., Matsukura, F., Cibert, J., Ferrand, D., (2000) Science, 287, p. 1019
- Zhang, S.B., Wei, S.H., Zunger, A., (2001) Phys. Rev. B, 63, p. 075205

- Mandalapu, L.J., Zhang, Z., Chu, S., Liu, J.L., (2008) Appl. Phys. Lett., 92, p. 122101
- Tang, K., Gu, S., Wu, K., Zhu, S., Ye, J., Zhang, R., Zheng, Y., (2010) Appl. Phys. Lett., 96, p. 242101
- Kim, K.K., Kim, H.S., Hwang, D.K., Lim, J.H., Park, S.J., (2003) Appl. Phys. Lett., 83, p. 63
- Xiu, F.X., Yang, Z., Mandalapu, L.J., Liu, J.L., Beyermann, W.P., (2006) Appl. Phys. Lett., 88, p. 052106
- Vaithianathan, V., Lee, B.T., Kim, S.S., (2005) Appl. Phys. Lett., 86, p. 062101
- Guo, W., Allenic, A., Chen, Y.B., Pan, X.Q., Che, Y., Hu, Z.D., Liu, B., (2007) Appl. Phys. Lett., 90, p. 242108
- Wan, Q., (2006) Appl. Phys. Lett., 89, p. 082515

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