Characterization of Indium Nitride Epitaxial Films

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ABSTRACT

This paper is about the character of Inf film of high mobility. InN film on sapphire as the sample of experiment is made according to MOCVD. The crystalline quality of the InN film is sensitive to the underlying buffer layer when the film is grown under the high effect V/III ratio condition. So utilize HT-GaN, LT-GaN and annealing sapphire are used as the complex buffer layer to improve InN crystalline quality. The sample changes three groups of different grown parameters: temperature, pressure, NH3 flow rate and examines its characteristic. Impacts under different developmental conditions are compared accroding to the scanning of the surface and side with SEM, the structure characteristic of InN and crystallization quality confirmed with X-ray diffraction, and carrier mobility and carrier concentration in InN determined with Hall measurement.

Keywords : InN film ; MOCVD ; XRD

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REFERENCES

參考文獻 [1] R. Juza and H. Hahn, Z. Anorg. Allg. Chem. 239, 282 (1938).
[2] 林弘偉, ” 氮化銦磊晶及量子點材料之研究 ”,清華大學物理所,碩士論文(2004) [3] 李宗憲, ” 有機金屬化學氣相沉積法成長氮化銦薄膜之特性研究 ”,中央大學物理所,碩士論文(2006) [4] Yeh. Cet al., Phys. Rev. B: Condens. Matter. 46, 10086 (1992).
[5] S. Strite and H. Morkoc, J. Vac. Sci. Technol. B10, 1237 (1992) [6] Z.L. Xie, R. Zhang, B. Liu, L. Li, C.X. Liu, X.Q. Xiu, H. Zhao, P. Han, S.L. Gu, Y. Shi, Y.D. Zheng. Jcg 298 409 – 412 (2007).
[7] 林家慶, ” 氮化鎵磊晶缺陷之研究 ”,碩士論文(2000) [8] 范妮婉, ” 以光致螢光及X-光繞射對分子束磊晶成長的氮化銦薄膜之研究 ”,中山大學物理所,碩士論文(2004) [9] Y. Satio, N. Teraguchi, A. Suzuki, and Y. Nanishi, Proceeding of theInternational Workshop on Nitride Semiconductorsn (IWN ’ 2000),Nagoya, Japan, September 24-27, 2000. IPAP conference series 1,p182 [10] Y. Satio, T. Yamaguchi, H. Kanazawa, K. Kano, T. Araki, A. Suzuki, Y.Nanishi, and Y. Teraguchi, J. Cryst. Growth. 1017, 237-239 (2002) [11] A. G. Bhuiyan, A. Hashimoto, and A. Yamamoto, J. Appl. Phys. 94, 2779-2808, (2003) [12] V. Y. Davydov et al. Phys. Status. Solidi (B), 229 R1 (2002) [13] W.Walukoiewicz,"Phys.E.20,300(2004)" [14] Y.T.Shih,W.c.chiang,"J.Appl.,92,2446(2002)" [15] T. L. Tansiey and C. P. Foley, J. Appl. Phys. 59, 3241 (1986) [16] J.Grandal, M. A. Sanchez-Garcia, J. Crystal Growth 278, 373 (2005) [17] E.Kurimoyo, M.Hangyo, H.Harima, M.Yoshimoto,T.Yamaguchi ,T. Araki,Y.Nanishi,K.Kisoda,Appl.Phys.Lett.84 212 (2004)