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博士論文題目：

高頻應用之砷化銦鋁/砷化銦鎵變異結構高電子移動率電晶體之研究

The Study of InAlAs/InGaAs Metamorphic High Electron Mobility Transistors for
High Frequency Applications

Publication List

Journal papers:

1. **Yi-Chung Lien**, Szu-Hung Chen, Edward Yi Chang, Ching-Ting Lee, Li-Hsin Chu, and Chia-yuan Chang, "Fabrication of 0.15- μm Γ -Shaped Gate $\text{In}_{0.52}\text{Al}_{0.48}\text{As}/\text{In}_{0.6}\text{Ga}_{0.4}\text{As}$ Metamorphic HEMTs Using DUV Lithography and Tilt Dry-Etching Technique," *IEEE Electron Device Lett.*, vol.28, Feb, 2007.
2. **Yi-Chung Lien**, Edward Yi Chang, Szu-Hung Chen, Li-Hsin Chu, Po-Chou Chen, and Yen-Chang Hsieh, "Thermal stability of Ti/Pt/Cu Schottky contact on InAlAs layer," *Applied Physics Lett.*, vol. 89, 083517, Aug. 2006.
3. L. H. Chu, E. Y. Chang, S. H. Chen, **Y. C. Lien**, and C. Y. Chang, "Effect of Gate Sinking on the Device Performance of the InGaP/AlGaAs/InGaAs Enhancement-Mode PHEMT," *IEEE Electron Device Lett.*, vol. 28, Feb. 2007.
4. Li-Hsin Chu, Heng-Tung Hsu, Edward Yi Chang, Tser-Lung Lee, Sze-Hung Chen, **Yi-Chung Lien**, and Chun-Yen Chang, "Double δ -Doped Enhancement-Mode InGaP/AlGaAs/InGaAs Pseudomorphic High Electron Mobility Transistor for Linearity Application," *Japanese Journal of Applied Physics*, vol. 45, No. 35, pp.L932-934, 2006.
5. Cheng-Shih Lee, **Yi-Chung Lien**, Edward Yi Chang, Huang-Choung Chang, Szu-Houng Chen, Ching-Ting Lee, Li-Hsin Chu, and Yen-Chang Hsieh, "Copper-Airbridged Low-Noise GaAs PHEMT With $\text{Ti}/\text{WN}_x/\text{Ti}$ Diffusion Barrier for High-Frequency Applications," *IEEE Transaction on Electron Device*, vol. 53, No. 8, pp.1753-1758, August. 2006.
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7. **Y. C. Lien**, Edward Yi Chang, H. C. Chang, L. H. Chu, G. W. Huang, H. M. Lee, C. S. Lee, S. H. Chen, P. T. Shen, and C. Y. Chang, "Low-Noise Metamorphic HEMTs With Reflowed 0.1- μm T-Gate," *IEEE Electron Device Lett.*, vol. 25, pp.348-350, Jun. 2004.
8. H. C. Chang, E. Y. Chang, **Y. C. Lien**, L. H. Chu, S. W. Chang, R. C.

- Huang, and H. M. Lee, "Use of WN_x as diffusion barrier for copper airbrided low noise GaAs PHEMT," *Electron. Lett.*, vol. 39, pp. 1763-1765, Nov. 2003.
9. R. H. Horng, D. S. Wu, **Y. C. Lien**, and W. H. Lan, "Low-resistance and high-transparency Ni/indium tin oxide ohmic contacts to p-GaN," *Appl. Phys. Lett.*, vol. 79, pp. 2925-2927, Oct. 2001.
 10. R. H. Horng, **Y. C. Lien**, W. C. Peng, D. S. Wu, C. Y. Tseng, C. H. Seieh, M. F. Huang, S. J. Tsai, and J. S. Liu, "High-Brightness Wafer-Bonded Indium-Tin Oxide/Light-Emitting Diode/Mirror/Si," *Jpn. J. Appl. Phys.* Vol. 40, pp. 2747-2751, Apr. 2001.

Conference papers:

1. Chia-Yuan Chang, Edward Yi Chang, **Yi-Chung Lien**, Yasuyuki Miyamoto, Sze-Hung Chen, and Li-Shin Chu, "High Power Performance GaAs Metamorphic HEMTs with 90-nm Sidewall T-gate," *2006 IEEE International Conference on Semiconductor Electronics*, Kuala Lumpur, Malaysia, Nov 31-Dec 2, 2006.
2. **Yi-Chung Lien**, Edward Yi Chang, Sze-Hung Chen, Li-Shin Chu, Guo-Wei Huang, Yi-Shuan Peng, and Chien-I Kuo, "High RF Performance GaAs Metamorphic HEMTs with 90-nm Sidewall T-gate," *Symposium on Nano Device Technology 2005*, pp. 272-273, Taiwan, 2005.
3. Y. C. Hsieh, E. Y. Chang, G. L. Luo, T. H. Yang, L. H. Chu, **Y. C. Lien**, and C. Y. Lu, "A GaAs MESFET Structure Grown on the Ge/Si_xGe_{1-x}/Si Substrate by MOVPE", in CS-MAX, Compound Semiconductor Manufacturing Expo, Compound Semiconductor Integrated Circuit Symposium, Palm spring, CA, USA, Oct 30-Nov 2, , 2005.
4. Wei-Cheng Wu, Heng-Tung Hsu, Edward Yi Chang, Chen-Hua Huang, Yin-Chu Hu, Li-Han Hsu, and **Yi-Chung Lien**, "Flip-Chip Packaged In_{0.52}Al_{0.48}As/InGaAs Metamorphic HEMT Device for Millimeter Wave Application," Extended abstract of a paper presented at CS-MAX, Palm Springs, CA, October 30-November 2, 2005.
5. **Y. C. Lien**, E. Y. Chang, H. C. Chang, L. H. Chu, S. H. Chen, and C. S. Lee, "A Copper Airbrided Low-Noise GaAs PHEMT with Ti/ WN_x /Ti Diffusion

Barrier for High Frequency Applications,” *Asia-Pacific Microwave Conference 2004*, New Delhi, India, 2004.

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8. **Yi-Chung Lien**, Edward Yi Chang; Li-Xing Chu; Huang-Choung Chang; Cheng-Shih Lee; Szu-Hung Chen; Yueh-Ching Lin; Huang-Ming Lee, “A metamorphic high electron-mobility transistor with reflowed submicron T-gate for high-speed optoelectronics applications,” *Proceedings of the Sixth Chinese Optoelectronics Symposium*, pp.281 – 283, 12-14 Sept, 2003.
9. **Yi-Chung Lien**, Edward Yi Chang, Huang-Choung Chang, Li-Xing Chu, Huang-Ming Lee, Cheng-Shih Lee, Szu-Hung Chen, Yueh-Ching Lin, Po-Tsun Shen, “Low Noise Metamorphic HEMTs with Reflowed Submicron T-Gate,” *European Microwave Week 2003, GaAs 2003*, Munich, Germany, 2003.
10. Y. L. Huang, C. Y. Fang, Edward Y. Chang, C. S. Lee, S. H. Chen, H. M. Lee, and **Yi-Chung Lien**, “An AlGaN/GaN HEMT with WN_x T-gate for High Temperature Application,” *Electrochemical Society Proceedings*, Volume 2002-14, pp.131-138.
11. Y. L. Huang, C. Y. Fang, Edward Y. Chang, C. S. Lee, S. H. Chen, H. M. Lee, and **Yi-Chung Lien**, “An AlGaN/GaN HEMT with WN_x T-gate for High Temperature Application,” *Electrochemical Society 2002*, Volume 2002-14, pp. 131-138, 2002.
12. **Y. C. Lien**, R. H. Horng, D. S. Wu, C. I. Chiang, W. H. Lan, W. J. Lin, and Y. C. Chen, “Transparent ITO ohmic contact to n-type GaN,” *International Photonics Conference*, Hsinchu, Taiwan, 2000.
13. R. H. Horng, **Y. C. Lien**, W. C. Peng, and D. S. Wu, “High-Brightness Wafer-Bonded ITO/AlGaInP/Mirror/Si Light-Emitting Diodes,” *2000*

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14. **Y. C. Lien**, R. H. Horng, D. S. Wu, M. F. Huang, K. H. Chung, P. H. Liu, K. C. Lin, and C. Y. Tseng “High-Brightness Wafer-Bonded AlGaInP/Mirror/Si Light-Emitting Diodes with transparent contact Indium Tin Oxide (ITO),” *1999 Symposium on Electro-Optics Technology*, NCCU, Taiwan, 1999.

專利研究：

1. 陳仕鴻、**連亦中**、張翼 “一種形成深次微米線寬結構的方法”，中華民國、美國，2006(審查中)。
2. 洪瑞華、武東星、**連亦中**、藍文厚、胡榮章、程亞桐，“使用多導電層作為p型氮化鎵歐姆接觸之透明電極製程與結構”，中華民國，2001。

