# Capítulo 6.

# Referencias.

[1] R. R. King, R.A. Sinton, R. M. Swanson. Studies of Diffused Phosphorous Emitters: Saturation Current, Surface Recombination Velocity, and Quantum Efficiency. IEEE Trans. Electron Devices, 37 (1990), Pg 365.

[2] A. Cuevas, D. Russell. Co-optimisation of the Emitter Region and the Metal Grid of Silicon Solar Cells. Prog. Photovolt: Res. Applicat, 8 (2000), Pg 603.

[3] M. J. Kerr, J. Schmidt, A. Cuevas, J.H. Bultman. Surface Recombination Velocity of Phosphorous-diffused silicon solar cell emitters passivated with plasma enhanced chemical vapor deposited silicon nitride and thermal silicon oxidede. Journal Applied Physics, 89 (2001), Pg 3821.

[4] I. Martin, M. Vetter, A. Orpella, J. Puigdollers, C. Voz, R. Alcubilla, J. D. Lacoste, P. Roca. Development of Emitters based on a-Si:H(n+)/ a-Si:H(i)/c-Si (p) Heterojunctions through Lifetime Spectroscopy. In Proc. of 19th EPVSEC, Paris (2004), Pg 2194.

[5] P. J. Cousins, J. E. Cotter. The Influence of Diffusion-Induced Dislocations on High Efficiency Silicon Solar Cells. IEEE Trans. On Electron Devices, 53 (2006), Pg 457.

[6] A. G. Aberle. Surface Passivation of Crystalline Silicon Solar Cells: a Review. Prog. Photovolt.: Res. Applicat. 8 (2000), Pg 603.

[7] J. F. Nijs, J. Szlufcik, J. Poortmans, S. Sivoththaman, R. P. Mertens. Advanced Manufacturing Concepts for Crystalline Silicon Solar Cells. IEEE Transactions on Electron Devices, 46 (1999) Pg 1948.

[8] J. M. Cabrera, F. J. López, F. A. López, "Fundamento de Óptica Electromagnética", Addison-Wesley Iberoamericana, (1993), Pg 113.

[9] G. G. Macfarlane and V. Roberts, "Infrared Absorption of Silicon Near the Lattice Edge", Physics Review, 98 (1955), Pg 1865.

[10] G. G. Macfarlane, T. P. McLean, J. E. Quarrington, and V. Roberts, "Fine Structure in the Absorption-Edge Spectrum of Ge", Physics Review, 108 (1957), Pg 1377.

[11] H. A. Weaklien and D. Redfield "Temperature dependence of the optical properties of silicon" Journal Applied Physics, 50 (1979), Pg 1491.

[12] G. E. Jellison, Jr and D. H. Lowndes, "Optical absorption coefficient of silicon at 1,152 μm at elevated temperatures", Applied Physics Letter, 41 (1982), Pg 594.

[13] H. J. Eichler, F. Massmann, E. Biselli, K. Richter, M. Glotz, L. Konetzke and X. Yang, "Laser induced free-carrier and temperature gratings in silicon, Physical Review B, 36 (1987), Pg 3247.

[14] J. C. Sturm, P. M. Garona and P. V. Schwartz, “Temperature control of silicon-germaniun alloy epitaxial growth on silicon substrates by infrared transmission”, Journal Applied Physics, 56 (1990), Pg 69.

[15] J. Nulman, S. Antonio and W. Blonigan, “Observation of silicon wafer emissivity in rapid thermal processing chambers for pyrometric temperature monitoring”, Applied Physics letter, 56 (1990), Pg 2513.

[16] John. M. Essick and Richard T. Mather “Characterization of a bulk semiconductor’s band gap via a near–absorption edge optical transmission experiment”, American Journal Physics. 61 (1993), Pg 646.

[17] P. Vandenabeele and K. Maex, “Influence of temperature and backside roughness on the emisivity of Si wafers during rapid thermal processing”, Journal Applied Physics, 72 (1992), Pg 5867.

[18] Ralf B. Bergmann “Optical in situ monitoring of solid phase crystallization of amorphous silicon”, Journal of Crystal Growth, 165 (1996), Pg 341.

[19] H. Rogne, P. T. Timans and H. Ahmed “Infrared absorption in silicon at elevated temperatures” Applied physics letter, 69 (1996), Pg 2190.

[20] S. M. Sze, “Physics Semiconductor Devices”, 2ª Edition, John Wiley & Sons, (1981), Pg 24.

[21] Jasprit Singh,"Semiconductor device, Basic principles", John Wiley & Sons, Inc, (2001), Pg 114.

[22] P. J. Timans, "Emissivity of silicon at elevated temperatures" Journal Applied Physics, 74 (1993), Pg 6353.

[23] K. G. Svantesson, "Determination of the interband and the free carrier absorption constants in silicon at high-level photoinjection", Journal Applied Physics. 12 (1979), Pg 425.

[24] H. J. Eichler, F. Massmann, E. Biselli, K. Richter, M. Glotz, L. Konetzke, and X. Yang, "Laser-induced free-carrier and temperature gratings in silicon", Physics Review. B, 36 (1987), Pg 3247.

[25] K. G. Svantesson and N G Nilsson, "Determination of the temperature dependence of the free carrier and interband absorption in silicon at 1.06μm", Journal Applied Physics. 12 (1979), Pg 3837.

[26] S. M. Sze, "Semiconductor Divices Physics and Technology", John Wiley & Sons, (985), Pg 26.

[27] C. D. Thurmond, "The Standard Thermodynamic Functions for the Formation of Electrons and Holes in Ge, Si, GaAs, and GaP", Journal of the Electrochemical Society, 122 (1975), Pg 1133.

[28] T. Sató, “Spectral Emissivity of Silicon”,JPN Journal Applied Physics, 6 (1966), Pg 339.

[29] R. J. Collins and H. Y. Fan, “Infrared lattice absorption bands in germanium, silicon and diamond”, Physical Review, 93 (1954), Pg 674.

[30] D. A. Kleinman and W. G. Spitzer, “Infrared lattice absorption of GaP“, Physical Review, 115 (1960), Pg 110.

[31] J. C. Sturm and C. M. Reaves, “Silicon Temperature Measured by Infrared Absorption: Fundamental Processes and Doping Effects”, IEEE Transactions on Electron Devices, 39 (1992), Pg 81.

[32] G. G. Macfarlane, T. P. McLean, J. E. Quarrington and V. Roberts, “Fine structure in the absorption-edge spectrum of Si”, Physical Review, 111 (1958), Pg 1245.

[33] C. C. Lee and H. Y. Fan, “Two-photon absorption with exciton effect for degenerate valence bands”, Phisics Review, B 9 (1974), Pg 3502.

[34] D. K. Schroder, R. Noel Thomas and John C. Swartz, “Free carrier absorption in silicon” IEEE Journal of Solid-State circuits,SC-13 (1978), Pg 180.

[35] N G Nilsson and K G Svantesson, “The role of free carrier absorption in laser annealing of silicon at 1.06μm”, Journal Applied Physics.13 (1980), Pg 39.

[36] G. E. Jellison, Jr., F. A. Modine, C. W. White, R. F. Wood and R. T. Young, “Optical properties of heavily doped silicon between 1,5 and 4,1 eV”, Physical Review Letters, 46 (1981), Pg 1414.

[37] G. E. Jellison, Jr. and F. A. Modine, “Optical functions between 1,7 and 4,7 eV at elevated temperatures”, Physical Review B, 27 (1983), Pg 7486.

[38] J. M. Moison, F. Barthe and M. Bensoussan, “Laser-induced nonlinear ansorption in silicion: Free-carrier absorption versus thermal effects” Physical Review B, 46 (1983), Pg 3611.

[39] R. A. Soref and Brian R. Bennett, “Electroopical effects in silicon”, IEEE Journal of Quantum Electronics, QE-23 (1987), Pg 123.

[40] G. Chen, R. B. Fair and T. Borca-Tausiuc, “Photon effect on radioactive properties of silicon during rapid thermal processing” Journal Applied Physics, 82 (1997), Pg 830.

[41] K. Sasaki, M. M. Rahman and S. Furukawa, “An Amorphous SiC:H Emitter Heterojunction Bipolar Transistor”, IEEE Electron Device Letters, 6 (1985), Pg 311.

[42] R. B. Iverson and R. Reif, “Recristallization of amorphized polycrystalline silicon films on $SiO_2$: Temperature dependence of the crystallization parameters”. Journal Applied Physics, 62 (1987), Pg 1675.

[43] T. Suggi, T. Ito, Y. Furumura, M. Doki, F. Mieno and M. Maeda, “a-SiC/Si hetorojunction bipolar transistor wuth high current gain”, IEEE Electron Device Letters, 9 (1988), Pg 87.

[44] Gang Liu and S. J. Fonash, “Selective area crystallization of amorphous silicon films by low-temperature rapid thermal annealing“ ,Applied Physics Letter, 55 (1989), Pg 660.

[45] H. Matsuura, “Hydrogenated amorphous-silicon/crystalline-silicon heterojunctions: Propierties and applications”, IEEE Transactions On Electron Devices, 36 (1989), Pg 290.

[46] H. Matsumura, “Study on catalytic chemical vapour depositions method to prepare hydrogenated amorphous silicon”, Journal Applied Physics, 65 (1989), Pg 4396.

[47] A. Kohno, T. Sameshima, N. Sano, M. Sekiya, H. Hara, “High performance poly-Si TFTs fabricated using pulsed laser annealing and remote plasma CVD with low temperature processing”, IEEE Transactions on Electron Devices,42 (1995), Pg 251.

[48] Chau-Hong Kuo,a) In-Cha Hsieh, and Dieter K. Schroder, George N. Maracas, Sheau Chen,“ Ex situ ellipsometry characterization of excimer laser annealed amorphous silicon thin films grown by low pressure chemical vapor deposition”, Applied Physics Letter, 71 (1997), Pg359.

[49] A. Orpella, D. Bardés, R. Alcubilla, L. F. Marsal and J. Pallares, “In-situ-Doped Amorphous $Si_{0,8}C_{0,2}$ Emitter Bipolar Transistors”, IEEE Electron Device Letters, 29 (1999), Pg 1741.

[50] L. F. Marsal, A. Orpella, J. Pallares ,D. Barde´s, R. Alcubilla, and X. Correig, “Analysis of conduction mechanisms in annealed n-Si12 xCx:H/ p-c-Si heterojunction diodes for different doping concentrations”, Journal of Applied Physics, 85 (1999), Pg 1216.

[51] K. Pangal, T. H. Buyuklimanli, J. C. Sturm and S. Wagner, “Hydrogen plasma enhanced crystallization of hydrogenated amorphous silicon films”, Journal of Applied Physics, 20 (1999), Pg 818.

[52] M. Hatano, K. Suzuki, P. Costas, S. M. Grigoropoulos, and M. Lee, “Excimer laser-induced temperature field in melting and resolidification of silicon thin films”, Journal of Applied Physics, 87 (2000), Pg 36.

[53] Ching-Lin Fan, Mao-Chien Chen and Yith Chang, “A novel twp-step annealing for the fabrication of high perfonance low temperature poly-Si TFTs”, Journal of Electrochemical Society, 150 (2003), Pg 178.

[54] P. Hashemi, J Derakhshandeh, S. Mohajerzadeh, M. D. Robertson, J. C. Bennett, A. Shayan Arani and A. Afzali-Kusha, "Characterization of low-temperature stress induced crystallization of a-Si an flexible glass substrates by transmission electron microscopy and raman spectroscopy", IEEE, (2005), Pg 326.

[55] F. Kail, A. Hadjadj, P. Roca I Cabarrocas,"Hydrogen diffusion and induced-crystallization in intrinsic and doped hydrogenated amorphous silicon films" Thin Solid Films, 427 (2005), Pg 126.

[56] Jun-Dar Hwang, Jyh-Yeu Chang and G. J. Chen, "Two-step annealing for nickel-induced crystallization of amorphous silicon films, Journal of The Electrochemical Society, 152 (2005), Pg 487.

[57] B. Garcia, M. Estrada, F. Cruz-Gandarilla, M. N. P. Carreno, I. Pereyra, "Differences in the laser annealing of a-Si:H and a-SiC films", Proceedings of the Fifth IEEE International Caracas Conference on Devices, Circuits and Systems, 1 (2004), Pg164.

[58] Sukti Hazra, Isao Sakata, Mitsuyuki Yamanaka, and Eiichi Suzuki, "Evolution of an amorphous silicon network from silicon paracrystallites studied by spectroscopic ellipsometry",Physical Review B, 29 (2004),Pg 235.

[59] Yeu-Long Jiang, Yung-Chih Chang, “Rapid crystallization of a-Si:H films with various silicon-to-hydrogen bonding configurations using rapid energy transfer annealing” Thin Solid Films, 500 (2006), Pg 316.

[60] J. Tauc, R. Grigorovinci and A. Vancu, “Optical propierties and electronic structure of amorphous germanium”, Physics of Status Solid, 15 (1966), Pg 627.

[61] A. Orpella, “Fabricación, Caracterización y Modelado de Transistores Bipolares Con Emisores de Silicio-Carbono Amorfo Recocido”, Tesis Doctoral, Universidad Politécnica de Cataluña, Barcelona-España (1999).

[62] I. Matin, “Silicon surface passivation by plasma Enhanced chemical vapor deposited amorphous silicon carbide films“ Tesis Doctoral, Universidad Politecnica de Catalunya, (2002).

[63] P. Roca i Cabarrocas, “Plasma enhanced chemical vapor deposition of silicon thin films for large area electronics”, Solid State and Materials Science, 6 (2002), Pg 439.

[64] R. Swanepoel, “Determination of the thickness and optical constants of amorphous silicon”, Journal Physics E, 16 (1983), Pg 1214.

[65] A. B. Jaballah, M. Hassen, M. Hajji,“Chemical vapour etching of silicon and porous silicon: silicon solar cells and micromachining applications”,. Physica Status Solidi A, 202(8) (2005); Pg 1606.

[66] I. Solomon, M. P. Schimidt and H. Tran-Quoc, “Selective low-power plasma decomposition of silane.methane mixtures for the preparation of methylated amorphous silicon”, Physical Review B, 38 (1988), Pg 9895.

[67] A. Orpella, I. Martín, M. Vetter, J. Puigdollers, C.Voz, R. Ferre, M. Garind And R. Alcubilla, “Phosphorous-Diffused silicon solar cell emitters with plasma enhanced chemical vapour deposited silicon carbide. Solar Energy Material Solar Cells, 87 (2004), Pg 667.

[68] K. Feenstra, R. E. I. Schropp, W. F. Van-der-Weg, “Deposition of Amorphous Silicon Films by Hot-Wire Chemical Vapor Deposition”. Journal Applied Physics. 85 (1999), Pg 6843.

[69] F. Demichelis, C. F. Pirri and E. Tresso, “Microcrystallization Formation in Silicon Carbide Thin films”. Philosophical Magazine. Pt.B. Structural, Electronic, Optical and Magnetic Properties. 66 (1992), Pg. 135.

[70] Robertson, R. M., “Hot-Wire Chemical Vapor Deposition of Silicon from Silane: Effect of Process Conditions”, Thesis, Department of Chemical Engineering, University of Delaware, (1985).

[71] J. Kinicki, “ Amorphous & Microcristalline Semiconductor Devices. Volume II: Materials and Devices Phycis, Ed. Artech House”, London, (1992).

[72] I. Martín, M. Vetter, A. Orpella, J. Puigdollers, A. Cuevas y R. Alcubilla, "Surface passivation of p-Type crystalline Si by plasma enhanced chemical vapor deposited amorphous SiCx:H films", Applied Physics Letters, 79 (2001), Pg 2199.

[73] A. Orpella, J. Puigdollers, D. Bardés, R. Alcubilla, L.F. Marsal, J. Pallarès, "Fabrication and characterization of in-situ doped a-Si0.8C0.2 emitter bipolar transistors", Solid State Electronics, 44 (2000), Pg.1543.

[74] I. Martín, M. Vetter, A. Orpella, C. Voz, J. Puigdollers, R. Alcubilla, 17th EPSEC Proc, Vol.3, (2002), Pg 2954.

[75] K. Pangal, "Hydrogen-Plasma-Enhanced Crystallization of Hydrogenated Amorphous Silicon Films: Fundamental Mechanisms and Applications", Princeton University, Thesis doctoral, (1999).

[76] M. T. Perez-Prado, J. J. Vlassak, "Microstructural evolution in electroplated Cu thin films", *Scripta Materialia*, 27 (2002), Pg 817.

[77] S. Peters, "Rapid Thermal Processing of Crystalline Silicon Materials and Solar Cells",Universität Konstanz Fachbereich Physik, Thesis doctoral, mündlichen Prüfung, (2004).

[78] D. H Lowndes, J. W. Clean, W. H. Christie, R. E. Eby, G. E. Jellison, J. Narayan, R. D. Westbrook and R. F. Wood, "Pulsed excimer laser annealing of ion implanted silicon:Characterization and solar cell fabrication",Applied Physics Letter, 41 (1982), Pg 938.

[79] G. Harbeke, “Polycrystalline semiconductor physical properties and applications”, Springer-Verlag, Berlin, (1995), Pg 185.

[80] P. Roca i Cabarrocas, “Plasma enhanced chemical vapor deposition of silicon thin films for large area electronics”, Current Opinion in Solid State and Materials Science, 6 (2002), Pg 439.

[81] B. Equer, P. Roca i Cabarrocas,J. Robertson,R. Buerkle, “Thin Film Materials for Large Area Electronics”, EMRS Symposia Proceedings 103. Thin Solid Films (2001);Pg 383:

[82] F. Kail, T, A. Hadjadj, P. Roca i Cabarrocasa, “Hydrogen diffusion and induced-crystallization in intrinsic and doped” Thin Solid Films, 487 (2005), Pg 40.

[83] Xiang-Zheng Bo, Nan Yao, J. C. Sturm, “Large-grain polycrystalline silicon films with low intragranular defect density by low-temperature solid-phase crystallization without underlying oxide”, Journal of Applied Physics, 91 (2002) 2910.

[84] P: Roura, J. Farjas, Chandana Rath, J. Serra-Millares, E. Bertran and P. Roca, I. Cabarrocas, “Calorimetry of dehydrogenation and dangling-bond recombination in several hydrogenated amorphous silicon materials”, Physical Review B, 73 (2006), Pg 08523-01.

[85] A. Hadjadj, P. St'ahel, V. Paret, J. C. Martin, P. Roca I cabarrocas, and Y. Bounouch, "Optimun doping level in a-Si:H and a-SiC:H materials", Journal Applied Physics, 83 (1998), Pg 830.

[86] R. B. Wehrspohn, M. J. Powell, S. C. Deane, P. Roca i Cabarroca and D. French, "Dangling-Bond defects state cration in microcrystalline silicon thin-film transistor", Applied Physics Letters, 77 (2000), Pg 750.

[87] M. Vetter, I. Martín, A. Orpella, C. Voz, J. Puigdollers and R. Alcubilla, "Characterization of a-$SiC_x$:H filims for c-Si surface passivation", Materials Research Society, 715 (2002), Pg 539.

[88] Yeon-Gon Mo, R. O. Dillon, and P. G. Snyder, "Visible and infrared photochromic properties of amorphous WO32 x films", Journal of Vacuum Science & Technology A, 17(1999), Pg 2933.

[89] A. A. E. Stevens, W. M. M. Kessels, M. C. M. van de Sanden, and H. C. W. Beijerinck," Amorphous silicon layer characteristics during 70–2000 eV Ar+-ion bombardment of Si(100)", Journal of Vacuum Science & Technology A, 24(2006), Pg 1933.

[90] S. Abdesselem, M. S. Aida, N. Attaf, A. Ouahab, "Growth mechanism of sputtered amorphous silicon thin films" Journal of Applied Physics, B. (2006) Pg. 33.

[91] W. Spitzer and H. Y. Fan, "Infrared Absorption in *n*-Type Silicon", Physics Review, 108 (1957), Pg 268.

[92] T. Sakurai and T. Sató, "Temperature dependence of vibrational spectra in calcite by means of emissivity measurement", Physical Review B, 4 (1971), Pg 583.

[93] G. E. Jellison, Jr. and F. A. Modine, "Parameterization of the optical functions of amorphous materials in the interband region", Applied Physics Letter,. 69 (1996), Pg 371.

[94] A. Hadjadj, P. St'ahel, P. Roca i Cabarrocas, V. Paret, Y. Bounouh, and J. C. Martin, "Optimum doping level in a-Si:H and a-SiC:H materials ", J. Appl. Phys. 83, (1998), Pg 830.

[95] Yeu-Long Jiang, Yung-Chih Chang, "Rapid crystallization of a-Si:H films with various silicon-to- hydrogen bonding configurations using rapid energy transfer annealing" Thin Solid Films, 500 (2006), Pg 316.

[96] Miltiadis K. Hatalis and David W. Greve, "Large grain polycrystalline silicon by low-temperature annealing of low-presure chemical vapour deposition amorphous silicon films", Journal Applied Physics, 63 (1988), Pg 2260.

[97] A. Yin and S. J. Fonash, “Oxigen plasma enhanced crystallization of a-Si for low thermal budget poly-si TFTs on corning 7059 glass”, IEEE, 15 (1993), Pg 93.

[98] Melvin Arami, “Granulation phase change and microstructure: Kinetic of phase change III”. Journal Chemical Physics, 9 (1941), Pg 177.

[99] S S Kubakaddi and B G Mulimani, “Free-carrier absorption in semiconducting quantum well wires”, Journa of Physics C: Solid States Physiscs, 18 (1987), Pg 6647.

[100] T. F. Bogges, Jr, M. K. Bohnert, K. Mansour, C. Steven. and L. A. Lsmirl, “Simultaneous Measurement of the TWQ-Coefficient and Free-Carrier Cross Section Above the Bandgap of Crystalline Silicon”, IEEE Journal of Quantum Electronics, 22 (1996), Pg 360.