

Literaturverzeichnis

- [1] W. Hess. *Bild der Wissenschaft*, 5:70, 2003.
- [2] T. M. Burton, J. M. Woodstock, K. Roy, B. Garrad, J. Alonso, J. Nijs, A. Räuber, A. Vallera, H. Schade and B. Dimmler. *Energie für die Zukunft: Erneuerbare Energieträger*. Europäische Kommission, 1998.
- [3] M. Ch. Lux-Steiner and G. Willeke. *Physikalische Blätter*, 57 (11):47, 2001.
- [4] R. Gay. *Solar Energy Materials and Solar Cells*, 47:19, 1997.
- [5] V. Probst, W. Stetter, J. Palm, S. Zweigert, M. Wendl, H. Vogt, L. Ufert, H. Calwer, B. Freenstein and F. H. Karg. *Proc. 17th Europ. Phot. Sol. En. Conf., Munich*, 2001.
- [6] M.J. Romero, K. Ramanathan, M.A. Contreras, M.M. Al-Jassim, J. Abushama and R. Noufi. *Proc. of the NREL Photovoltaic Review Meeting, Denver, USA*, 2003.
- [7] V. Nadenau, D. Hariskos and H. W. Schock. *Proc. of 14th Eur. Phot. Sol. En. Conf., Barcelona, Spain*, page 1250, 1997.
- [8] M. Contreras, NRL, USA. *privat communications*, 2003.
- [9] M. Saad, H. Riazi, E. Bucher and M. Ch. Lux-Steiner. *Appl. Phys. A*, 62:181, 1996.
- [10] M. Ch. Lux-Steiner. *Habilitationsschrift*. Universität Konstanz, 1991.
- [11] R. Nitzsche. *Fortschr. Miner.*, 44:231, 1967.
- [12] H. Schäfer. *Chemische Transportreaktionen*. Verlag Chemie, Weinheim, 1962.
- [13] Hahn-Meitner-Institut GmbH. *Patent Nr. DE 198 55 021 C1*.
- [14] N. Meyer. *Dissertation*. Freie Universität Berlin, Berlin, 2000.
- [15] D. Fischer. *Dissertation*. Freie Universität Berlin, Berlin, 2000.
- [16] H. Hahn, G. Frank und W. Klinger. *Z. Anorg. Chem.*, 271:153, 1953.
- [17] H. G. Grimm unt A. Sommerfeld. *Zeitschrift für Physik*, 36:36, 1926.

- [18] I. Martil, J. Santamaria, G. Gonzales-Diaz and F. Sanchez Quesada. *J. Appl. Phys.*, 68 (1):189, 1990.
- [19] J. L. Shay, B. Tell, H. M. Kasper and L. M. Schiavone. *Phys. Ref. B*, 5:5003, 1972.
- [20] J. L. Shay and H. Wernick. *Ternary chalcopyrite semiconductors: growth, electronic properties and applications*. Pergamon Press, Oxford, 1975.
- [21] J. C. Mikkelsen. *J. of Electronic Materials*, 10:541, 1981.
- [22] G. Marin, S. Tauleigne, S. M. Wasim, R. Guevara, J. M. Delgado, C. Rincon, A. E. Mora and G. Sanchez Perez. *Mat. Res. Bull.*, 33:1057, 1998.
- [23] S. M. Wasim, C. Rincón, G. Marin and J. M. Delgado. *Appl. Phys. Lett.*, 77 (1):94, 2000.
- [24] S. Nishiwaki, S. Siebentritt amd M. Ch. Lux-Steiner. *in Proc. of MRS Spring Meeting 2003, San Francisco, USA*, 2003.
- [25] G. Marin, S. M. Wasim, C. Rincon, G. Sanchez Perez, Ch. Power and A. E. Mora. *J. Appl. Phys.*, 83 (6):3364, 1998.
- [26] C. Rincon, S. M. Wasim, G. Marin, R. Marquez, L. Nieves, G. Sanchez Perez and E. Medina. *J. Appl. Phys.*, 90 (9):3364, 2001.
- [27] H. Neumann. *Cryst. Res. Technol.*, 18 (7):901, 1983.
- [28] S. H. Wei, S. B. Zhang and A. Zunger. *Appl. Phys. Lett.*, 72(24):3199, 1998.
- [29] S. Fichter, Y. Tomm, K. Diesner and T. Weiss. *Jpn. J. Appl. Phys.*, 39 Suppl.39-1:123, 2000.
- [30] J. A. Van Vechten. *Handbook of Semiconductors: A simple man's view of the thermochemistry of semiconductors*. T. S. Moss, North-Holland Publishing Company, Amsterdam, 1980.
- [31] A. Zunger, S. B. Zhang and S. H. Wei. *Proc. 26th IEEE*, page 313, 1997.
- [32] W. Walukiewicz. *J. Vac. Sci. Technol. B*, 5:1062, 1987.
- [33] S. B. Zhang, S. H. Wei and A. Zunger. *Phys. Rev. B*, 57(16):9642, 1998.
- [34] J. H. Schön, J. Oestreich, O. Schenker, H. Riazi-Nejad, M. Klenk, N. Fabre, E. Arushanov and E. Bucher. *Appl. Phys. Lett.*, 75 (19):2969, 1999.
- [35] J. H. Schön and E. Bucher. *16th Eur. PV. Sol. En. Conf.*, Glasgow, Schottland, 2000.
- [36] S. B. Zhang, S. H. Wei and A. Zunger. *Phys. Rev. Lett.*, 78 (21):4059, 1997.

- [37] S. Schuler, S. Nishiwaki, J. Beckmann, N. Rega, S. Brehme, S. Siebentritt and M. Ch. Lux-Steiner. *in 29th IEEE Photovoltaic Specialist Conference, IEEE New Orleans*, 2002.
- [38] A. Rumberg, C. Sommerhalter, M. Toplak, A. Jäger-Waldau and M. Ch. Lux-Steiner. *Thin Solid Films*, 361-362:172, 2000.
- [39] G. Eriksson. *ChemSage 4.0 (Computer program)*. GTT Technologies, Herzogenrath, 1997.
- [40] A. Rumberg. *Dissertation*. Freie Universität Berlin, Berlin, 2001.
- [41] N. Meyer, T. Tylla, D. Fischer, M. E. Beck, A. Jäger-Waldau and M. Ch. Lux-Steiner. *16th Eur. PV Sol. En. Conf.*, Glasgow, UK, 2000.
- [42] D. Fuertes Marrón. *Dissertation*. Freie Universität Berlin, Berlin, 2003.
- [43] D. Fuertes Marrón, A. Meeder, U. Bloeck, P. Schubert-Bischoff, N. Pländer, R. Würz, S. M. Babu, Th. Schedel-Niedrig and M. Ch. Lux-Steiner. *Thin Solid Films*, in press, 2003.
- [44] D. Fischer, T. Tylla, N. Meyer, M. E. Beck, A. Jäger-Waldau and M. Ch. Lux-Steiner. *Thin Solid Films*, 387:63, 2001.
- [45] R. Klenk, R. Menner, D. Cahen and H. W. Schock. *Proc. IEEE PV Specialist Conf.*, page 481, 1990.
- [46] D. Fuertes Marrón, A. Meeder, I. Gavilanes-Perez, A. Rumberg, A. Jäger-Waldau and M. Ch. Lux-Steiner. *Proc. of the PVSec.*, Munich:1159, 2001.
- [47] P. Y. Yu and M. Cardona. *Fundamentals of Semiconductors - Physics and Material Properties*. Springer, Berlin, 1996.
- [48] J. I. Pankove. *Optical Processes in Semiconductors*. Dover Publications, New York, 1975.
- [49] H. B. Bebb and E. W. Williams. *Transport and Optical Phenomena*. Academic Press, New York, 8 edition, 1972.
- [50] B. I. Shklovskii and A. L Efros. *Electronic Properties of Doped Semiconductors*. Springer, Berlin, 45 edition, 1984.
- [51] R. S. Knox. *Theory of Excitons*. Academic Press, New York, 5 edition, 1963.
- [52] A. Bauknecht, S. Siebentritt, J. Albert, Y. Tomme and M. Ch. Lux-Steiner. *Jpn. J. Appl. Phys.*, 39 Suppl.:322, 2000.
- [53] A. Yamada, Y. Makita, S. Niki, A. Obara, P. Fons, H. Hajime, M. Kawai, S. Chichibu and H. Nakanishi. *J. Appl. Phys.*, 79:4318, 1996.
- [54] D. D. Sell, S. E. Stokowski, R. Dingle and J. V. DiLorenzo. *Phys. Rev. B*, 7:4568, 1973.

- [55] F. Askary, P. Y. Yu. *Solid State Comm.*, 47:241, 1983.
- [56] Y. Toyozawa. *Prog. Theor. Phys. Suppl.*, 12:111–140, 1959.
- [57] D. M. Eagles. *J. Phys. Chem. Solids*, 16:76, 1960.
- [58] D.E. Cooper, J. Bajaj and P. R. Newman. *J. Cryst. Growth*, 86:544, 1988.
- [59] T. Schmidt, K. Lischka and W. Zulehner. *Phys. Rev. B*, 45 (16):8989, 1992.
- [60] R. Dingle. *Phys. Rev.*, 178 (3):1310, 1969.
- [61] A. Bauknecht, S. Siebentritt, J. Albert and M. Ch. Lux-Steiner. *J. Appl. Phys.*, 89:4391, 2001.
- [62] P. J. Dean and J. L. Merz. *Phys. Rev.*, 184 (3):1310, 1969.
- [63] W. Schairer and W. Graman. *J. Phys. Chem. Solids*, 30:2225, 1969.
- [64] S. Chichibu, S. Shirakata, S. Isomura, Y. Harada, M. Uchida, S. Matsumoto and H. Higuchi. *J. Appl. Phys.*, 77 (3):1225, 1995.
- [65] D. G. Thomas, J. J. Hopfield, and W. M. Augustyniak. *Phys. Rev.*, 140 (1A):343, 1965.
- [66] G. E. Stillmann. *Characterisation and Properties of Semiconductors*. North Holland, Amsterdam, 3 edition, 1994.
- [67] A. Bauknecht. *Dissertation*. Freie Universität Berlin, Berlin, 2000.
- [68] R.R. Sharma and S. Rodriguez. *Phys Rev*, 153(3):823, 1967.
- [69] H. Atzmüller, F. Fröschl and U. Schröder. *Phys Rev*, 19(6):3118, 1979.
- [70] S. M. Wasim and G. Sanchez Porras. *Physica Status Solidi a*, 79:K65, 1983.
- [71] M. Quintero, C. Rincon and P. Grima. *J. Appl. Phys.*, 65 (7):2739, 1988.
- [72] H. B. Bebb and E. W. Williams. *Transport and Optical Phenomena*. Academic Press, New York, 8 edition, 1972.
- [73] S. Schuler. *Dissertation*. Freie Universität Berlin, Berlin, 2002.
- [74] S. Siebentritt, A. Gerhard, S. Brehme and M. Ch. Lux-Steiner. *Mat. Res. Soc. Symp. Proc.*, H4.4.1:668, 2001.
- [75] B. Schumann, A. Tempel, G. Kühn, H. Neumann, Nguyen van Nam and T. Hänsel. *Kristall und Technik*, 13(11):1285, 1978.
- [76] J. H. Schön, F. P. Baumgartner, E. Arushanov, H. Riagati-Nejad, Ch. Kloc and E. Bucher. *J. Appl. Phys.*, 79(9):6961, 1996.

- [77] I. V. Bodnar, A. G. Karoza and G. F. Smirnova. *Phys. Stat. Sol. B*, 84:K65, 1977.
- [78] F. J. Ramirez and C. Rincon. *Solid State Comm.*, 84 (5):551, 1992.
- [79] S. Lee, M. Gunes, C. R. Wronski, N. Maley and M. Bennett. *Appl. Phys. Lett*, 59:1578, 1991.
- [80] N. N. Syrbu, M. Bogdanash, V. E. Tezlevan und I. Mushcutariu. *Physica B*, 229:199, 1997.
- [81] S. Chichibu, Y. Harada, M. Uchida, T. Wakiyama, S. Matsumoto, S. Shirakata, S. Isomura and H. Higuchi. *J. Appl. Phys.*, 76 (5):3009, 1994.
- [82] K. Yoshino, D. Maruoka, T. Ikari, p. J. Fons, S. Niki and A. Yamada. *Appl. Phys. Lett*, 77:259, 2000.
- [83] Y. P. Varshni. *Physica*, 134:149, 1967.
- [84] K. P. O'Donnell and X. Chen. *Appl. Phys. Lett*, 58:2924, 1991.
- [85] Z. Yang, K. P. Homewood, M. S. Finney, M. A. Harry, and J. Reeson. *J. Appl. Phys.*, 78:1958, 1995.
- [86] R. Pässler. *Phys. Stat. Sol. B*, 200:155, 1997.
- [87] J. M. Ziman. *Electrons and Phonons: The Theory of Transport Phenomena in Solids*. Clarendon, Oxford, 1960.
- [88] C. Rincon and F. Ramirez. *J. Appl. Phys.*, 72:4321, 1992.
- [89] A. Yamada, A. Nishio, P. Fons, H. Shibata, K. Matsubara and S. Niki. *Proc. of MRS*, San Francisco, USA, 2003.
- [90] O. Knacke, O. Kubaschewski and K. Hesselmann. *Thermochemical properties of inorganic substances*. Springer, New York, 1991.
- [91] W. B. Jackson and N. M. Amer. *Phys. Rev. B*, 25:5559, 1982.
- [92] M. Vanecik, J. Kocka, J. Stuchlik, Z. Kozisek, O. Stika and A. Triska. *Sol. Energy Mater.*, 8:411, 1983.
- [93] R. Crandall. *Phys. Rev. Lett*, 44:749, 1980.
- [94] A. C. Boccara, D. Fournier and J. Badoz. *Appl. Phys. Lett.*, 36:130, 1980.
- [95] W. B. Jackson, N. M. Amer, A. C. Boccara and D. Fournier. *Appl. Opt.*, 20:1333, 1981.
- [96] H. Curtins and M. Favre. World Scientific Publishing Company, Singapore, 1988.
- [97] Z. Erol Smith III. *Dissertation*. Princeton University, 1987.

- [98] Kühn-Birett. *Merkblätter Gefährliche Arbeitsstoffe*, volume 29. Med. Verlagsgesellschaft, München-Landsberg, 3/1986.
- [99] A. B. Djurisic and E. H. Li. *Appl. Phys. A*, 73:189, 2001.
- [100] T. Kawashima, S. Adachi, H. Miyake and K. Sugiyama. *J. Appl. Phys.*, 84(9):5202, 1998.
- [101] Pierz, H. Mell and J. Terukov. *J. Non-Cryst. Solids*, 77-78:547, 1985.
- [102] R. H. Bube. *Photoelectronic Properties of Semiconductors*. Cambridge, 1992.
- [103] A. Mettler, N. Wyrsch and A. Shah. *J. Non-Cryst. Solids*, 164-166:427, 1993.
- [104] J. Kocka, M. Vanecák and A. Triska. *Amorphous Silicon and related materials*. World Scientific Publishing Company, Singapore, 1988.
- [105] J. Tauc, R. Grigorovici and A. Vancu. *phys. stat. sol.*, 15:627, 1966.
- [106] W. B. Jackson, S. M. Kelso, C. C. Tsai, J. W. Allen and S. J. Oh. *Phys. Rev. B*, 31:5187, 1985.
- [107] H. Stiebig, F. Siebke. *Phil. Mag. B*, 72:489, 1995.
- [108] S. M. Wasim, C. Rincón, G. Marin, P. Bocaranda, E. Hernández, I. Bonalde, E. Medina. *Phys. Rev. B*, 64:195101, 2001.
- [109] F. Urbach 92. *Phys. Rev.*, 92:1324, 1953.
- [110] S. Schuler, S. Nishiwaki, M. Dziedzina, R. Klenk, S. Siebentritt and M. Ch. Lux-Steiner. *in Proc. of MRS*, 668, 2001.
- [111] M. H. Chan, S. K. So, K. T. Chan and F. G. Kellert. *Appl. Phys. Lett.*, 76(6):834, 1995.
- [112] W. van Roosbroeck and W. Shockley. *Phys. Rev.*, 94(6):1558, 1954.
- [113] P. Würfel. *J. Phys. C*, 15:3967, 1982.
- [114] E. Daub and P. Würfel. *Phys. Rev. Lett.*, 74(6):1020, 1995.
- [115] K. Schick, E. Daub, S. Finkbeiner and P. Würfel. *Appl. Phys. A*, 54:109, 1992.
- [116] G. Lasher and F. Stern. *Phys. Rev.*, 133(2A):A553, 1964.
- [117] N. Wyrsch, F. Finger, T.J. McMahon and M. Vanecek,. *J. Non-Crystal. Sol.*, 137-138:347, 1991.
- [118] A. Meeder. *Diplomarbeit*. Christian-Albrechts-Universität zu Kiel, Kiel, 2000.
- [119] A. Einstein. *Ann. Phys.*, 17:132, 1905.
- [120] S. Tunama, C. J. Powell and D. R. Penn. *Surf. Interf. Anal.*, 11:577, 1988.

- [121] G. K. Wertheim, D. N. E. Buchanan, E. E. Chaban and J. E. Rowe. *Solid State Comm.*, 83 (10):1785, 1992.
- [122] C. N. Berglund and W. E. Spicer. *Phys. Rev. A*, 136:1030, 1964.
- [123] J. B. Pendry. *J. Phys. C*, 14:1381, 1981.
- [124] D. P. Woodruff, N. V. Smith, P. D. Johnson and W. A. Royer. *Phys. Rev. B*, 26:2943, 1982.
- [125] C. D. Wagner, W. M. Riggs, L. E. Davei, J. F. Moulder and G. E. Muilenberg. *Handbook of X-Ray Photoelectron Spectroscopy*. Perkin-Elmer Corporation, 1978.
- [126] I. Kojima and M. Kurahashi. *J. Electr. Spectr. Re. Phen.*, 42:177, 1987.
- [127] L. Weinhardt. *Diplomarbeit*. Universität Würzburg, 2001.
- [128] D. W. Niles, K. Ramanathan, F. Hasoon, R. Noufi, B. J. Tielsch, J. E. Fulghum. *J. Vac. Sci. Technol.*, A 15 (6):3044, 1997.
- [129] M. Morkel, L. Weinhardt, B. Lohmüller, C. Heske, E. Umbach, W. Riedl, S. Zweigart, F. Karg. *Appl. Phys. Lett.*, 79 (27):4482, 2001.
- [130] M. Sander, W. Jaegermann, H. J. Lewerenz. *J. Phys. Chem.*, 96:782, 1992.
- [131] C. Heske, R. Fink, E. Umbach, W. Riedl and F. Karg. *Appl. Phys. Lett.*, 68 (24):3431, 1996.
- [132] C. Heske, G. Richter, Z. Chen, R. Fink, E. Umbach, W. Riedl, F. Karg. *J. Appl. Phys.*, 82 (5):2411, 1997.
- [133] V. Lyahovitskaya, Y. Feldman, K. Gartsman, H. Cohen, C. Cytermann and D. Cahen. *J. Appl. Phys.*, 91 (7):4205, 2002.
- [134] D. Braunger, D. Harisko, G. Bilger, U. Rau, H. W. Schock. *thin solid films*, 361:161, 2000.
- [135] C. Heske, D. Eich, R. Fink, E. Umbach, M. M. Grush, T. A. Callcott, F. J. Himpsel, D. L. Ederer, R. C. C. Perera, W. Riedl and F. Karg. *Appl. Phys. Lett.*, 75 (14):2082, 1999.
- [136] D. Schmidt, M. Ruckh, H. W. Schock. *Appl. Surf. Science*, 103:409, 1996.
- [137] G. E. McGuire, G. K. Schweitzer and T. A. Carlson. *Inorganic Chemistry*, 12 (10):2450, 1973.
- [138] J. H. Scofield. *J. Electr. Rel. Phen.*, 8:129, 1976.
- [139] D. Schmid, M. Ruck, F. Grunwald and H. W. Schock. *J. Appl. Phys.*, 73 (6):2902, 1993.
- [140] I. M. Kötschau. *Dissertation*. Universität Stuttgart, 2002.

- [141] L. Kipp. *Habilitationsschrift*. Christian-Albrechts-Universität zu Kiel, 1999.
- [142] D. Eich, K. Ortner, U. Groh, Z. H. Chen, C. R. Becker, G. Landwehr, R. Fink and E. Umbach. *Phys. Stat. Sol. (a)*, 173:261, 1999.
- [143] D. Eich, D. Hübner, R. Fink, E. Umbach, K. Ortner, C. R. Becker, G. Landwehr and A. Fleszar. *Phys. Rev. B*, 61 (19):12666, 2000.
- [144] Th. Gleim, C. Heske, E. Umbach, C. Schumacher, W. Waschinger, Ch. Ammon, M. Probst and H.-P. Steinrück. *Appl. Phys. Lett.*, 78 (13):1867, 2001.
- [145] U. Fideler. *Dissertation*. Freie Universität Berlin, 2001.
- [146] L. J. van der Pauw. *Philips Research Reports*, 13:1, 1958.
- [147] Th. Meyer, F. Engelhardt, J. Parisi and U. Rau. *J. Appl. Phys.*, 91 (8):5093, 2002.
- [148] J. H. Schön and E. Bucher. *J. Phys. D: Appl. Phys.*, 34:25, 2001.
- [149] R. P. Vasquez. *Surf. Sci. Spec.*, 2 (2):149, 1994.