

REFERENCES

- [1] Junghänel, M. Novel aqueous electrolyte films for hole conduction in dye sensitized solar cells and development of an electron transport model. Text, Freie Universität Berlin, 2007.
- [2] Pashaei, B.; Shahroosvand, H.; Abbasi, P. Transition metal complex redox shuttles for dye-sensitized solar cells. *RSC Advances* **2015**, *5*, 94814-94848.
- [3] Lv, M.; Zheng, D.; Ye, M.; Xiao, J.; Guo, W.; Lai, Y.; Sun, L.; Lin, C.; Zuo, J. Optimized porous rutile TiO₂ nanorod arrays for enhancing the efficiency of dye-sensitized solar cells. *Energy & Environmental Science* **2013**, *6*, 1615-1622.
- [4] Shi, Y.; Zhu, C.; Wang, L.; Li, W.; Fung, K. K.; Wang, N. Asymmetric ZnO Panel-Like Hierarchical Architectures with Highly Interconnected Pathways for Free-Electron Transport and Photovoltaic Improvements. *Chemistry – A European Journal* **2013**, *19*, 282-287.
- [5] Ye, M.; Xin, X.; Lin, C.; Lin, Z. High Efficiency Dye-Sensitized Solar Cells Based on Hierarchically Structured Nanotubes. *Nano Letters* **2011**, *11*, 3214-3220.
- [6] Ye, M.; Chen, C.; Lv, M.; Zheng, D.; Guo, W.; Lin, C. Facile and effective synthesis of hierarchical TiO₂ spheres for efficient dye-sensitized solar cells. *Nanoscale* **2013**, *5*, 6577-6583.
- [7] Luo, L.; Tao, W.; Hu, X.; Xiao, T.; Heng, B.; Huang, W.; Wang, H.; Han, H.; Jiang, Q.; Wang, J.; Tang, Y. Mesoporous F-doped ZnO prism arrays with significantly enhanced photovoltaic performance for dye-sensitized solar cells. *Journal of Power Sources* **2011**, *196*, 10518-10525.
- [8] Mahmood, K.; Kang, H. W.; Park, S. B.; Sung, H. J. Hydrothermally Grown Upright-Standing Nanoporous Nanosheets of Iodine-Doped ZnO (ZnO:I) Nanocrystallites for a High-Efficiency Dye-Sensitized Solar Cell. *ACS Applied Materials & Interfaces* **2013**, *5*, 3075-3084.

- [9] Pang, H.;Yang, H.;Guo, C. X.; Li, C. M. Functionalization of SnO₂ Photoanode through Mg-Doping and TiO₂-Coating to Synergically Boost Dye-Sensitized Solar Cell Performance. *ACS Applied Materials & Interfaces* **2012**, *4*, 6261-6265.
- [10] Chang, J.;Ning, Y.;Wu, S.;Niu, W.; Zhang, S. Effectively Utilizing NIR Light Using Direct Electron Injection from Up-Conversion Nanoparticles to the TiO₂ Photoanode in Dye-Sensitized Solar Cells. *Advanced Functional Materials* **2013**, *23*, 5910-5915.
- [11] Yang, N.;Yuan, Q.;Zhai, J.;Wei, T.;Wang, D.; Jiang, L. Enhanced Light Harvesting in Plasmonic Dye-Sensitized Solar Cells by Using a Topologically Ordered Gold Light-Trapping Layer. *ChemSusChem* **2012**, *5*, 572-576.
- [12] Chen, P.-Y.;Dang, X.;Klug, M. T.;Qi, J.;Dorval Courchesne, N.-M.;Burpo, F. J.;Fang, N.;Hammond, P. T.; Belcher, A. M. Versatile Three-Dimensional Virus-Based Template for Dye-Sensitized Solar Cells with Improved Electron Transport and Light Harvesting. *ACS Nano* **2013**, *7*, 6563-6574.
- [13] Desai, U. V.;Xu, C.;Wu, J.; Gao, D. Hybrid TiO₂-SnO₂ Nanotube Arrays for Dye-Sensitized Solar Cells. *The Journal of Physical Chemistry C* **2013**, *117*, 3232-3239.
- [14] Chandiran, A. K.;Tetreault, N.;Humphry-Baker, R.;Kessler, F.;Baranoff, E.;Yi, C.;Nazeeruddin, M. K.; Grätzel, M. Subnanometer Ga₂O₃ Tunnelling Layer by Atomic Layer Deposition to Achieve 1.1 V Open-Circuit Potential in Dye-Sensitized Solar Cells. *Nano Letters* **2012**, *12*, 3941-3947.
- [15] Kim, H.-N.; Moon, J. H. Enhanced Photovoltaic Properties of Nb₂O₅-Coated TiO₂ 3D Ordered Porous Electrodes in Dye-Sensitized Solar Cells. *ACS Applied Materials & Interfaces* **2012**, *4*, 5821-5825.
- [16] Kim, K. S.;Song, H.;Nam, S. H.;Kim, S.-M.;Jeong, H.;Kim, W. B.; Jung, G. Y. Fabrication of an Efficient Light-Scattering Functionalized Photoanode Using Periodically Aligned ZnO Hemisphere Crystals for Dye-Sensitized Solar Cells. *Advanced Materials* **2012**, *24*, 792-798.
- [17] Y. Chergui, N. N. a. D. E. M. Comparative Study of Dye-Sensitized Solar Cell Based on ZnO and TiO₂ Nanostructures. In *Solar Cells - Dye-Sensitized Devices*

- L. A. Kosyachenko, Ed.; InTech; Winchester, 2011; pp 49-62.
- [18] Chou, C.-S.;Chou, F.-C.; Kang, J.-Y. Preparation of ZnO-coated TiO₂ electrodes using dip coating and their applications in dye-sensitized solar cells. *Powder Technology* **2012**, *215–216*, 38-45.
- [19] Liu, X.;Fang, J.;Liu, Y.; Lin, T. Progress in nanostructured photoanodes for dye-sensitized solar cells. *Frontiers of Materials Science* **2016**, 10.1007/s11706-016-0341-0, 1-13.
- [20] He, Y.;Hu, J.; Xie, Y. High-efficiency dye-sensitized solar cells of up to 8.03% by air plasma treatment of ZnO nanostructures. *Chemical Communications* **2015**, *51*, 16229-16232.
- [21] Jasim, K. E. Dye Sensitized Solar Cells, Working Principles, Challenges and Opportunities. In *Solar Cells - Dye-Sensitized Devices*. P. L. A. Kosyachenko, Ed., 2011; pp 191-193.
- [22] Alberti, A.;Pellegrino, G.;Condorelli, G. G.;Bongiorno, C.;Morita, S.;La Magna, A.; Miyasaka, T. Efficiency Enhancement in ZnO:Al-Based Dye-Sensitized Solar Cells Structured with Sputtered TiO₂ Blocking Layers. *The Journal of Physical Chemistry C* **2014**, *118*, 6576-6585.
- [23] Jong-Su Woo , G.-E. J. A Comparative Study on the Various Blocking Layers for Performance Improvement of Dye-sensitized Solar Cells. *Transactions on Electrical and Electronic Materials* **2013**, *14*, 312-316.
- [24] Sahay, R.;Sundaramurthy, J.;Suresh Kumar, P.;Thavasi, V.;Mhaisalkar, S. G.; Ramakrishna, S. Synthesis and characterization of CuO nanofibers, and investigation for its suitability as blocking layer in ZnO NPs based dye sensitized solar cell and as photocatalyst in organic dye degradation. *Journal of Solid State Chemistry* **2012**, *186*, 261-267.
- [25] Raksa, P.;Nilphai, S.;Gardchareon, A.; Choopun, S. Copper oxide thin film and nanowire as a barrier in ZnO dye-sensitized solar cells. *Thin Solid Films* **2009**, *517*, 4741-4744.
- [26] Habibi, M. H.;Karimi, B.;Zendehtel, M.; Habibi, M. Fabrication, characterization of two nano-composite CuO–ZnO working electrodes for dye-sensitized solar

cell. *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy* **2013**, *116*, 374-380.

- [27] Korzhavyi, P. A. *Literature Review on the Properties of Cuprous Oxide Cu₂O and the Process of Copper Oxidation*; Svensk Kärnbränslehantering AB, Swedish Nuclear Fuel and Waste Management Company, 2011.
- [28] A.S. Moskvina, N. N. L., Yu. P. Sukhorukov, M.A. Sidorov, A.A. Samokhvalov Characteristic features of the electronic structure of copper oxide (CuO): Initiation of the polar configuration phase and middle-IR optical absorption. *Journal of Experimental and Theoretical Physics* **1994**, *105*, 967-993.
- [29] Zoolfakar, A. Tuning and engineering of ZnO and Cu_xO for sensor, solar cells and memory devices. Doctor Thesis, RMIT University, 2013.
- [30] Hafsa Siddiqui, M. R. P., Padmini Pandey, Neha Singh, M.S. Qureshi and Fozia. Haque A Review: Synthesis, Characterization and Cell Performance of Cu₂O Based Material for Solar Cells, *Oriental Journal of Chemistry* **2012**, *28*, 1533-1545.
- [31] Zhang, Z.;Che, H.;Gao, J.;Wang, Y.;She, X.;Sun, J.;Gunawan, P.;Zhong, Z.; Su, F. Shape-controlled synthesis of Cu₂O microparticles and their catalytic performances in the Rochow reaction. *Catalysis Science & Technology* **2012**, *2*, 1207-1212.
- [32] Yang, C.;Su, X.;Wang, J.;Cao, X.;Wang, S.; Zhang, L. Facile microwave-assisted hydrothermal synthesis of varied-shaped CuO nanoparticles and their gas sensing properties. *Sensors and Actuators B: Chemical* **2013**, *185*, 159-165.
- [33] Ji, H.;Miao, X.;Wang, L.;Qian, B.; Yang, G. Microwave-assisted hydrothermal synthesis of sphere-like C/CuO and CuO nanocrystals and improved performance as anode materials for lithium-ion batteries. *Powder Technology* **2013**, *241*, 43-48.
- [34] Kaewyai, K.;Choopun, S.;Thepnurat, M.;Gardchareon, A.;Phadunghitidhada, S.; Wongratanaphisan, D. Preparation and Characterization of Copper Oxide Nanofibers by Microwave-Assisted Thermal Oxidation. *Journal of Nanoelectronics and Optoelectronics* **2013**, *8*, 472-476.

- [35] R.K. Swarnkar;S.C. Singh; Gopal, a. R. Optical Characterizations of Copper Oxide Nanomaterial. *Proceeding of the International Conference on Optics and Photonics, Chandigarh, India* **2009**.
- [36] Swarnkar, R. K.;Singh, S. C.; Gopal, R. Synthesis of copper/copper-oxide nanoparticles: Optical and structural characterizations. In *AIP Conference Proceedings*, 2009; pp 205-210.
- [37] Lamberti, A.;Destro, M.;Bianco, S.;Quaglio, M.;Chiodoni, A.;Pirri, C. F.; Gerbaldi, C. Facile fabrication of cuprous oxide nanocomposite anode films for flexible Li-ion batteries via thermal oxidation. *Electrochimica Acta* **2012**, *86*, 323-329.
- [38] Barreca, D.;Comini, E.;Gasparotto, A.;Maccato, C.;Sada, C.;Sberveglieri, G.; Tondello, E. Chemical vapor deposition of copper oxide films and entangled quasi-1D nanoarchitectures as innovative gas sensors. *Sensors and Actuators B: Chemical* **2009**, *141*, 270-275.
- [39] Chiang, C.-Y.;Aroh, K.;Franson, N.;Satsangi, V. R.;Dass, S.; Ehrman, S. Copper oxide nanoparticle made by flame spray pyrolysis for photoelectrochemical water splitting – Part II. Photoelectrochemical study. *International Journal of Hydrogen Energy* **2011**, *36*, 15519-15526.
- [40] Abdu, Y. a. M., A.O. Copper (I) oxide(Cu₂O) based solar cells - A review. *Bayero Journal of Pure and Applied Sciences* **2009**, *2*, 8 - 12.
- [41] Son, D. I.;You, C. H.; Kim, T. W. Structural, optical, and electronic properties of colloidal CuO nanoparticles formed by using a colloid-thermal synthesis process. *Applied Surface Science* **2009**, *255*, 8794-8797.
- [42] Li, Y.;Kuai, P.;Huo, P.; Liu, C.-j. Fabrication of CuO nanofibers via the plasma decomposition of Cu(OH)₂. *Materials Letters* **2009**, *63*, 188-190.
- [43] H. L. Aye, S. C., T. Chairuang Sri Preparation of Nanoparticles by Laser Ablation on Copper Target in Distilled Water. *Advanced Materials Research* **2010**, *93-94* 83-86.

- [44] A. Sharma, S. B., S. Aggarwal, S. Chopra, and D. Kanjilal Synthesis of copper nanoparticles in polycarbonate by ion implantation. *Bulletin of Materials Science* **2011**, *34*, 645-649.
- [45] S.S. Chang, H. J. L., and H.J. Park Photoluminescence Properties of Spark-Processed CuO. *Ceramics International* **2005**, *31*, 411-415.
- [46] X. Xu, M. Z., J. Feng, and M. Zhang Shape-Controlled of Single-Crystalline Cupric Oxide Heating Using An Ionic Liquid. *Materials Letters* **2008**, *62*, 2787-2790
- [47] Min, Y.;Wang, T.; Chen, Y. Microwave-assistant synthesis of ordered CuO micro-structures on Cu substrate. *Applied Surface Science* **2010**, *257*, 132-137.
- [48] Guo, L.;Tong, F.;Liu, H.;Yang, H.; Li, J. Shape-controlled synthesis of self-assembly cubic CuO nanostructures by microwave. *Materials Letters* **2012**, *71*, 32-35.
- [49] Yang, G.;Kong, Y.;Hou, W.; Yan, Q. Heating behavior and crystal growth mechanism in microwave field. *Journal of Physical Chemistry B* **2005**, *109*, 1371-1379.
- [50] Xia, J.;Li, H.;Luo, Z.;Shi, H.;Wang, K.;Shu, H.; Yan, Y. Microwave-assisted synthesis of flower-like and leaf-like CuO nanostructures via room-temperature ionic liquids. *Journal of Physics and Chemistry of Solids* **2009**, *70*, 1461-1464.
- [51] Bhosale, M. A.;Bhatte, K. D.; Bhanage, B. M. A rapid, one pot microwave assisted synthesis of nanosize cuprous oxide. *Powder Technology* **2013**, *235*, 516-519.
- [52] Sharma, P.;Yeo, J. G.;Yu, J. H.;Han, M. H.; Cho, C. H. Effect of ethanol as an additive on the morphology and crystallinity of LTA zeolite. *Journal of the Taiwan Institute of Chemical Engineers* **2014**, *45*, 689-704.
- [53] Zhu, X.;Zhang, F.;An, Q.;Huang, H.;Sun, Q.;Li, L.;Teng, F.; Tang, W. Effect of solvent additive and ethanol treatment on the performance of PIDTDTQx:PC71BM polymer solar cells. *Solar Energy Materials and Solar Cells* **2015**, *132*, 528-534.

- [54] Sharma, P.; Yeo, J.-g.; Yu, J.-h.; Han, M. H.; Cho, C. H. Effect of ethanol as an additive on the morphology and crystallinity of LTA zeolite. *Journal of the Taiwan Institute of Chemical Engineers* **2014**, *45*, 689-704.
- [55] Yakimov, S. A.; Knyaz'kov, D. A.; Bol'shova, T. A.; Shmakov, A. G.; Korobeinichev, O. P.; Qi, F. Investigation of the effect of ethanol additives on the structure of low-pressure ethylene flames by photoionization mass spectrometry. *Combustion, Explosion, and Shock Waves* **2012**, *48*, 609-619.
- [56] Sun, J.; Wang, Y. Recent Advances in Catalytic Conversion of Ethanol to Chemicals. *ACS Catalysis* **2014**, *4*, 1078-1090.
- [57] Ghazikhani, M.; Hatami, M.; Safari, B.; Ganji, D. D. Experimental investigation of performance improving and emissions reducing in a two stroke SI engine by using ethanol additives. *Propulsion and Power Research* **2013**, *2*, 276-283.
- [58] E. de Jongh, P.; Vanmaekelbergh, D.; J. Kelly, J. Cu₂O: a catalyst for the photochemical decomposition of water? *Chemical Communications* **1999**, 10.1039/A901232J, 1069-1070.
- [59] Ruiz, E.; Alvarez, S.; Alemany, P.; Evarestov, R. A. Electronic structure and properties of Cu₂O. *Physical Review B - Condensed Matter and Materials Physics* **1997**, *56*, 7189-7196.
- [60] Meyer, B. K.; Polity, A.; Reppin, D.; Becker, M.; Hering, P.; Klar, P. J.; Sander, T.; Reindl, C.; Benz, J.; Eickhoff, M.; Heiliger, C.; Heinemann, M.; Bläsing, J.; Krost, A.; Shokovets, S.; Müller, C.; Ronning, C. Binary copper oxide semiconductors: From materials towards devices. *physica status solidi (b)* **2012**, *249*, 1487-1509.
- [61] Ekuma, C. E.; Anisimov, V. I.; Moreno, J.; Jarrell, M. Electronic structure and spectra of CuO. *Eur. Phys. J. B* **2014**, *87*, 1-6.
- [62] Samarasekara, P.; Kumara, N. T. R. N.; Yapa, N. U. S. Sputtered copper oxide (CuO) thin films for gas sensor devices. *Journal of Physics: Condensed Matter* **2006**, *18*, 2417.
- [63] Morkoç, H.; Özgür, Ü. General Properties of ZnO. In *Zinc Oxide*. Wiley-VCH Verlag GmbH & Co. KGaA, 2009; pp 1-76.

- [64] Jagadish, V. A. C. a. C. Basic Properties and Applications of ZnO. In *Zinc Oxide Bulk, Thin Films and Nanostructures*. D. o. E. M. Engineering, Ed.; Department of Electronic Materials Engineering, Research School of Physical Sciences and Engineering, The Australian National University; Department of Electronic Materials Engineering, Research School of Physical Sciences and Engineering, The Australian National University, Canberra, ACT 0200, Australia, 2006; pp 1-20.
- [65] Coleman, V. A.; Jagadish, C. Chapter 1 - Basic Properties and Applications of ZnO. In *Zinc Oxide Bulk, Thin Films and Nanostructures*. Elsevier Science Ltd; Oxford, 2006; pp 1-20.
- [66] Fan, Z.; Lu, J. G. Zinc Oxide Nanostructures: Synthesis and Properties. *Journal of Nanoscience and Nanotechnology* **2005**, *5*, 1561-1573.
- [67] Li, D.-g.; Zhen, H.; Xingcai, L.; Wu-gao, Z.; Jian-guang, Y. Physico-chemical properties of ethanol–diesel blend fuel and its effect on performance and emissions of diesel engines. *Renewable Energy* **2005**, *30*, 967-976.
- [68] Larsen, U.; Johansen, T.; Schramm, J. Ethanol as a Fuel for Road Transportation. Technical University of Denmark, Department of Mechanical Engineering, 2009.
- [69] Wang, C.-B.; Cai, Y.; Wachs, I. E. Reaction-Induced Spreading of Metal Oxides onto Surfaces of Oxide Supports during Alcohol Oxidation: Phenomenon, Nature, and Mechanisms. *Langmuir* **1999**, *15*, 1223-1235.
- [70] Komorowska-Durka, M.; van Houten, R.; Stefanidis, G. D. Application of microwave heating to pervaporation: A case study for separation of ethanol-water mixtures. *Chem. Eng. Process.* **2014**, *81*, 35-40.
- [71] Qi, D. H.; Chen, H.; Geng, L. M.; Bian, Y. Z. Effect of diethyl ether and ethanol additives on the combustion and emission characteristics of biodiesel-diesel blended fuel engine. *Renewable Energy* **2011**, *36*, 1252-1258.
- [72] Kong, M.; Zhang, W.; Yang, Z.; Weng, S.; Chen, Z. Facile synthesis of CuO hollow nanospheres assembled by nanoparticles and their electrochemical performance. *Applied Surface Science* **2011**, *258*, 1317-1321.

- [73] Liu, P.;Li, Z.;Cai, W.;Fang, M.; Luo, X. Fabrication of cuprous oxide nanoparticles by laser ablation in PVP aqueous solution. *RSC Advances* **2011**, *1*, 847-851.
- [74] Ahmed, A.;Gajbhiye, N. S.; Joshi, A. G. Shape controlled synthesis and characterization of Cu₂O nanostructures assisted by composite surfactants system. *Materials Chemistry and Physics* **2011**, *129*, 740-745.
- [75] Saito, G.;Hosokai, S.;Tsubota, M.; Akiyama, T. Synthesis of copper/copper oxide nanoparticles by solution plasma. *Journal of Applied Physics* **2011**, *110*, 023302.
- [76] Hai, Z.;Zhu, C.;Huang, J.;Liu, H.; Chen, J. Controllable Synthesis of CuO Nanowires and Cu₂O Crystals with Shape Evolution via γ -Irradiation. *Inorganic Chemistry* **2010**, *49*, 7217-7219.
- [77] Kooti, M.; Matouri, L. Fabrication of nanosized cuprous oxide using fehling's solution. *Transaction F: Nanotechnology* **2010**, *17*, 73-78.
- [78] Salavati-Niasari, M.; Davar, F. Synthesis of copper and copper(I) oxide nanoparticles by thermal decomposition of a new precursor. *Materials Letters* **2009**, *63*, 441-443.
- [79] Liu, X.;Geng, B.;Du, Q.;Ma, J.; Liu, X. Temperature-controlled self-assembled synthesis of CuO, Cu₂O and Cu nanoparticles through a single-precursor route. *Materials Science and Engineering: A* **2007**, *448*, 7-14.
- [80] Karunakaran, C.;Manikandan, G.; Gomathisankar, P. Microwave, sonochemical and combustion synthesized CuO nanostructures and their electrical and bactericidal properties. *Journal of Alloys and Compounds* **2013**, *580*, 570-577.
- [81] Nikam, A. V.;Arulkashmir, A.;Krishnamoorthy, K.;Kulkarni, A. A.; Prasad, B. L. V. pH-Dependent Single-Step Rapid Synthesis of CuO and Cu₂O Nanoparticles from the Same Precursor. *Crystal Growth & Design* **2014**, *14*, 4329-4334.
- [82] Nunes, D.;Pimentel, A.;Barquinha, P.;Carvalho, P. A.;Fortunato, E.; Martins, R. Cu₂O polyhedral nanowires produced by microwave irradiation. *Journal of Materials Chemistry C* **2014**, *2*, 6097-6103.

- [83] Meng, H.;Yang, W.;Ding, K.;Feng, L.; Guan, Y. Cu₂O nanorods modified by reduced graphene oxide for NH₃ sensing at room temperature. *Journal of Materials Chemistry A* **2015**, *3*, 1174-1181.
- [84] O'Regan, B.; Gratzel, M. A low-cost, high-efficiency solar cell based on dye-sensitized colloidal TiO₂ films. *Nature* **1991**, *353*, 737-740.
- [85] Lamant, T. the working principle of dye-sensitized solar cells. Stanford University, U.S.A, 2010.
- [86] SRIVASTAVA, R. ZnO Nanostructure Based Dye Sensitized Solar Cell. Jadavpur University, India, 2011.
- [87] iawei Gong, J. L., K. Sumathy Review on dye-sensitized solar cells (DSSCs): Fundamental concepts and novel materials. *Renewable and Sustainable Energy Reviews* **2012**, *16* 5848–5860.
- [88] Anta, J. A.;Guillén, E.; Tena-Zaera, R. ZnO-Based Dye-Sensitized Solar Cells. *The Journal of Physical Chemistry C* **2012**, *116*, 11413-11425.
- [89] Xu, J. F.;Ji, W.;Shen, Z. X.;Li, W. S.;Tang, S. H.;Ye, X. R.;Jia, D. Z.; Xin, X. Q. Raman spectra of CuO nanocrystals. *Journal of Raman Spectroscopy* **1999**, *30*, 413-415.
- [90] Mishra, P.;Upadhyaya, A.; Sethi, G. Modeling of microwave heating of particulate metals. *Metallurgical and Materials Transactions B* **2006**, *37*, 839-845.
- [91] Gupta, M.; Wai Leong, E. W. Microwaves – Theory. In *Microwaves and Metals*; John Wiley & Sons (Asia) Pte Ltd, 2007; pp 25-41.
- [92] Gupta, M.; Leong, E. W. W. *Microwaves and Metals*; Wiley, 2008.
- [93] Nollet, L. M. L. *Chromatographic Analysis of the Environment, Third Edition*; CRC Press: Belgium, 2005.
- [94] Mondal, A.;Agrawal, D.; Upadhyaya, A. Microwave heating of pure copper powder with varying particle size and porosity. *Journal of Microwave Power and Electromagnetic Energy* **2009**, *43*, 4315-43110.

- [95] Mishra, P.;Sethi, G.; Upadhyaya, A. Modeling of microwave heating of particulate metals. *Metallurgical and Materials Transactions B: Process Metallurgy and Materials Processing Science* **2006**, *37*, 839-845.
- [96] Khan, A. S. Fundamentals of Wave Propagation. In *Microwave Engineering: Concepts and Fundamentals*. Tralor &Francis Group, LLC; New York, USA, 2014; pp 17-30.
- [97] Waser, R. *Nanoelectronics and Information Technology: Advanced Electronic Materials and Novel Devices*; John Wiley & Sons, Inc.: New York, USA, 2003.
- [98] Leonelli, C.;Poli, G.; Veronesi, P. Numerical simulation and experimental evidence of accelerated necking during the early stages of microwave assisted sintering of metallic powders. *Metallurgia Italiana* **2007**, *99*, 27-34.
- [99] Demirskyi, D.;Agrawal, D.; Ragulya, A. Neck formation between copper spherical particles under single-mode and multimode microwave sintering. *Materials Science and Engineering A* **2010**, *527*, 2142-2145.
- [100] De Yoreo, J. J.; Vekilov, P. G. Principles of Crystal Nucleation and Growth. *Reviews in Mineralogy and Geochemistry* **2003**, *54*, 57-93.
- [101] Lovette, M. A.;Browning, A. R.;Griffin, D. W.;Sizemore, J. P.;Snyder, R. C.; Doherty, M. F. Crystal shape engineering. *Industrial and Engineering Chemistry Research* **2008**, *47*, 9812-9833.
- [102] Bendavid, L. I.; Carter, E. A. First-principles predictions of the structure, stability, and photocatalytic potential of Cu₂O surfaces. *Journal of Physical Chemistry B* **2013**, *117*, 15750-15760.
- [103] Soon, A.;Söhnel, T.; Idriss, H. Plane-wave pseudopotential density functional theory periodic slab calculations of CO adsorption on Cu₂O(1 1 1) surface. *Surface Science* **2005**, *579*, 131-140.
- [104] Kuo, C. H.; Huang, M. H. Morphologically controlled synthesis of Cu₂O nanocrystals and their properties. *Nano Today* **2010**, *5*, 106-116.
- [105] Xu, Y.;Wang, H.;Yu, Y.;Tian, L.;Zhao, W.; Zhang, B. Cu₂O nanocrystals: Surfactant-free room-temperature morphology-modulated synthesis and shape-

- dependent heterogeneous organic catalytic activities. *Journal of Physical Chemistry C* **2011**, *115*, 15288-15296.
- [106] Goodman, C. H. L. *Crystal growth: theory and techniques*; Plenum Press, 1974.
- [107] Ma, G.;Liu, S.;Wang, P.;Chang, J.;Zhang, M.; Li, H. Synthesis of pod-like Cu₂O nanowire arrays on Cu substrate. *Materials Letters* **2014**, *120*, 212-215.
- [108] Jim, K. M.;Kim, K. J.; Jang, Y. N. Effect of supersaturation on the particle size of ammonium sulfate in semibatch evaporative crystallization. *Industrial and Engineering Chemistry Research* **2013**, *52*, 11151-11158.
- [109] Liu, X.;Xu, J.;Fang, Z.;Lin, L.;Qian, Y.;Wang, Y.;Ye, C.;Ma, C.; Zeng, J. One-pot synthesis of Bi₂Se₃ nanostructures with rationally tunable morphologies. *Nano Research* **2015**, *8*, 3612-3620.
- [110] Xu, X.;Zhang, M.;Feng, J.; Zhang, M. Shape-controlled synthesis of single-crystalline cupric oxide by microwave heating using an ionic liquid. *Materials Letters* **2008**, *62*, 2787-2790.
- [111] Kappe, C. O.; Stadler, A. Microwave Theory. In *Microwaves in Organic and Medicinal Chemistry*. Wiley-VCH Verlag GmbH & Co. KGaA, 2006; pp 9-28.
- [112] Rao, K. J.;Vaidyanathan, B.;Ganguli, M.; Ramakrishnan, P. A. Synthesis of Inorganic Solids Using Microwaves. *Chemistry of Materials* **1999**, *11*, 882-895.
- [113] Sun, F.;Guo, Y.;Tian, Y.;Zhang, J.;Lv, X.;Li, M.;Zheng, Y.; Wang, Z. The effect of additives on the Cu₂O crystal morphology in acetate bath by electrodeposition. *Journal of Crystal Growth* **2008**, *310*, 318-323.
- [114] Rodriguez-Navarro, C.; Benning, L. G. Control of crystal nucleation and growth by additives. *Elements* **2013**, *9*, 203-209.
- [115] Mullin, J. W. *Crystallization*; Butterworth-Heinemann, 1993.
- [116] Fukumori, Y.;Nomura, T.;Adschiri, T.;Ohara, S.;Saito, F.;Naito, M.;Okuyama, K.;Kawahara, M.;Suzuki, H.;Sasaki, T.;Fuji, M.;Inagaki, S.;Takeuchi, H.; Ando, Y. Chapter 2 - Structural Control of Nanoparticles. In *Nanoparticle Technology Handbook*. Elsevier; Amsterdam, 2008; pp 49-112.

- [117] Samokhvalov A. A. , L. N. N., Sukhorukov Yu. P., Gruverman V. A., Gizhevskii B. A., Chebotaev N. M. Optical properties of CuO single crystals. *JETP Letters* **1989**, *49* 523-526.
- [118] Volanti, D. P.;Felix, A. A.;Suman, P. H.;Longo, E.;Varela, J. A.; Orlandi, M. O. Monitoring a CuO gas sensor at work: an advanced in situ X-ray absorption spectroscopy study. *Physical Chemistry Chemical Physics* **2015**, 10.1039/C5CP02150B.
- [119] Kidowaki, H.;Oku, T.; Akiyama, T. Fabrication and characterization of CuO/ZnO solar cells. *Journal of Physics: Conference Series* **2012**, *352*, 012022.
- [120] Hansen, B. J.;Lu, G.; Chen, J. Direct oxidation growth of CuO nanowires from copper-containing substrates. *J. Nanomaterials* **2008**, *2008*, 1-7.
- [121] Plane, J. M. C.; Saiz-Lopez, A. UV-Visible Differential Optical Absorption Spectroscopy (DOAS). In *Analytical Techniques for Atmospheric Measurement*; Blackwell Publishing; United States 2007; pp 147-188.
- [122] Rajab, F. M. Novel Nondestructive Measurement of Dye Adsorption on Solid Titania Films for Its Sensitized Solar Cells. *Journal of Minerals and Materials Characterization and Engineering* **2014**, *2*, 7.
- [123] Labat, F.;Le Bahers, T.;Ciofini, I.; Adamo, C. First-Principles Modeling of Dye-Sensitized Solar Cells: Challenges and Perspectives. *Accounts of Chemical Research* **2012**, *45*, 1268-1277.
- [124] Bisquert, J.;Fabregat-Santiago, F.;Mora-Seró, I.;Garcia-Belmonte, G.; Giménez, S. Electron Lifetime in Dye-Sensitized Solar Cells: Theory and Interpretation of Measurements. *The Journal of Physical Chemistry C* **2009**, *113*, 17278-17290.
- [125] Tang, X.;Wang, Y.; Cao, G. Effect of the adsorbed concentration of dye on charge recombination in dye-sensitized solar cells. *Journal of Electroanalytical Chemistry* **2013**, *694*, 6-11.
- [126] Gray, J. L. The Physics of the Solar Cell. In *Handbook of Photovoltaic Science and Engineering*. John Wiley & Sons, Ltd, 2011; pp 82-129.
- [127] Law, M.;Greene, L. E.;Johnson, J. C.;Saykally, R.; Yang, P. Nanowire dye-sensitized solar cells. *Nat Mater* **2005**, *4*, 455-459.

- [128] Tang, X.; Wang, Y.; Cao, G. Effect of the adsorbed concentration of dye on charge recombination in dye-sensitized solar cells. *Journal of Electroanalytical Chemistry* **2013**, *694*, 6-11.
- [129] Jiang, Y.; Yang, Y.; Qiang, L.; Fan, R.; Ning, H.; Li, L.; Ye, T.; Yang, B.; Cao, W. Based on Cu(II) silicotungstate modified photoanode with long electron lifetime and enhanced performance in dye sensitized solar cells. *Journal of Power Sources* **2015**, *278*, 527-533.
- [130] Lee, K. E.; Gomez, M. A.; Charbonneau, C.; Demopoulos, G. P. Enhanced surface hydroxylation of nanocrystalline anatase films improves photocurrent output and electron lifetime in dye sensitized solar cell photoanodes. *Electrochimica Acta* **2012**, *67*, 208-215.
- [131] Siddiqui, H.; Parra, M. R.; Pandey, P.; Singh, N.; Qureshi, M. S.; Haque, F. Z. A review: Synthesis, characterization and cell performance of Cu₂O based material for solar cells. *Oriental Journal of Chemistry* **2012**, *28*, 1533-1545.
- [132] Aruna, P. W.; Subhashini, G.; Shengyi, L.; Benjamin, C. C.; Nidal, A.-Z. Performance enhancement of polymer solar cells using copper oxide nanoparticles. *Semiconductor Science and Technology* **2015**, *30*, 064004.
- [133] Zhang, Q.; Dandeneau, C. S.; Zhou, X.; Cao, G. ZnO Nanostructures for Dye-Sensitized Solar Cells. *Advanced Materials* **2009**, *21*, 4087-4108.
- [134] Usami, A.; Seki, S.; Mita, Y.; Kobayashi, H.; Miyashiro, H.; Terada, N. Temperature dependence of open-circuit voltage in dye-sensitized solar cells. *Solar Energy Materials and Solar Cells* **2009**, *93*, 840-842.
- [135] Wu, C.; Jia, L.; Guo, S.; Han, S.; Chi, B.; Pu, J.; Jian, L. Open-Circuit Voltage Enhancement on the Basis of Polymer Gel Electrolyte for a Highly Stable Dye-Sensitized Solar Cell. *ACS Applied Materials & Interfaces* **2013**, *5*, 7886-7892.