

REFERENCES

- [1] Q. Zheng, Z. Li, J. Yang, and J.-K. Kim, "Graphene oxide-based transparent conductive films," *Progress in Materials Science*, vol. 64, pp. 200–247, 2014.
- [2] A. A. Green and M. C. Hersam, "Solution phase production of graphene with controlled thickness via density differentiation," *Nano letters*, vol. 9, no. 12, pp. 4031–4036, 2009.
- [3] A. K. Geim and K. S. Novoselov, "The rise of graphene," *Nature materials*, vol. 6, no. 3, pp. 183–191, 2007.
- [4] C. Lee, X. Wei, J. W. Kysar, and J. Hone, "Measurement of the elastic properties and intrinsic strength of monolayer graphene," *science*, vol. 321, no. 5887, pp. 385–388, 2008.
- [5] X. Shen, X. Lin, J. Jia, Z. Wang, Z. Li, and J.-K. Kim, "Tunable thermal conductivities of graphene oxide by functionalization and tensile loading," *Carbon*, vol. 80, pp. 235–245, 2014.
- [6] I. Fonseka, D. Mohotti, K. Wijesooriya, C.-K. Lee, and P. Mendis, "Influence of graphene oxide properties, superplasticiser type, and dispersion technique on mechanical performance of graphene oxide-added concrete," *Construction and Building Materials*, vol. 428, p. 136415, 2024.
- [7] A. Mohammed, J. Sanjayan, A. Nazari, and N. Al-Saadi, "Effects of graphene oxide in enhancing the performance of concrete exposed to hightemperature," *Australian Journal of Civil Engineering*, vol. 15, no. 1, pp. 61–71, 2017.
- [8] I. Fonseka, D. Mohotti, K. Wijesooriya, C.-K. Lee, and P. Mendis, "Influence of graphene oxide on abrasion resistance and strength of concrete," *Construction and Building Materials*, vol. 404, p. 133280, 2023.
- [9] K. Huang, H. Jing, Y. Gao, Z. Yu, M. Chen, and S. Sun, "Study on the properties of graphene oxide reinforced cement-based materials at high temperature," *Construction and Building Materials*, vol. 421, p. 135704, 2024.
- [10] C. Alonso and L. Fernandez, "Dehydration and rehydration processes of cement paste exposed to high temperature environments," *Journal of materials science*, vol. 39, no. 9, pp. 3015–3024, 2004.
- [11] G. A. Khoury, "Effect of fire on concrete and concrete structures," *Progress in structural engineering and materials*, vol. 2, no. 4, pp. 429–447, 2000.
- [12] E. U. Khan, R. A. Khushnood, and W. L. Baloch, "Spalling sensitivity and mechanical response of an ecofriendly sawdust high strength concrete at elevated temperatures," *Construction and Building Materials*, vol. 258, p. 119656, 2020.
- [13] M. K. al Bashiti and M. Naser, "Verifying domain knowledge and theories on fire-induced spalling of concrete through explainable artificial intelligence," *Construction and Building Materials*, vol. 348, p. 128648, 2022.

- [14] P. Lura and G. P. Terrasi, "Reduction of fire spalling in high-performance concrete by means of superabsorbent polymers and polypropylene fibers: Small scale fire tests of carbon fiber reinforced plastic-prestressed selfcompacting concrete," *Cement and Concrete Composites*, vol. 49, pp. 36–42, 2014.
- [15] R. Jansson, *Fire spalling of concrete: theoretical and experimental studies*. PhD thesis, KTH Royal Institute of Technology, 2013.
- [16] K. D. Hertz, "Limits of spalling of fire-exposed concrete," *Fire safety journal*, vol. 38, no. 2, pp. 103–116, 2003.
- [17] J.-C. Liu and K. H. Tan, "Fire resistance of strain hardening cementitious composite with hybrid pva and steel fibers," *Construction and Building Materials*, vol. 135, pp. 600–611, 2017.
- [18] E. W. Klingsch, "Explosive spalling of concrete in fire," *IBK Bericht*, vol. 356, 2014.
- [19] L. T. Phan, J. R. Lawson, and F. L. Davis, "Effects of elevated temperature exposure on heating characteristics, spalling, and residual properties of high performance concrete," *Materials and structures*, vol. 34, no. 2, pp. 83–91, 2001.
- [20] V. Kodur, "Properties of concrete at elevated temperatures," *International Scholarly Research Notices*, vol. 2014, no. 1, p. 468510, 2014.
- [21] E. Ghafari, H. Costa, E. Ju'lio, A. Portugal, and L. Dur~aes, "The effect of nanosilica addition on flowability, strength and transport properties of ultra high performance concrete," *Materials & Design*, vol. 59, pp. 1–9, 2014.
- [22] D. Matesov'a, D. Bonen, and S. P. Shah, "Factors affecting the resistance of cementitious materials at high temperatures and medium [0] heating rates," *Materials and structures*, vol. 39, no. 4, pp. 455–469, 2006.
- [23] Q. Fu, Z. Wang, Y. Xue, and D. Niu, "Catalysis and regulation of graphene oxide on hydration properties and microstructure of cement-based materials," *ACS Sustainable Chemistry & Engineering*, vol. 11, no. 14, pp. 5626–5643, 2023.
- [24] P. Zhang, Y. Sun, J. Wei, and T. Zhang, "Research progress on properties of cement-based composites incorporating graphene oxide," *Reviews on Advanced Materials Science*, vol. 62, no. 1, p. 20220329, 2023.
- [25] H. Fernandez-Moran, "Single crystals of graphite and mica as specimen support for electron microscopy," *J Appl Phys*, vol. 31, p. 1840, 1960.
- [26] Q. Zheng and J.-K. Kim, "Synthesis, structure, and properties of graphene and graphene oxide," in *Graphene for transparent conductors: synthesis, properties and Applications*, pp. 29–94, Springer, 2015.
- [27] C. Soldano, A. Mahmood, and E. Dujardin, "Production, properties and potential of graphene," *Carbon*, vol. 48, no. 8, pp. 2127–2150, 2010.

- [28] T. W. Ebbesen and H. Hiura, "Graphene in 3-dimensions: Towards graphite origami," 1995.
- [29] X. Lu, H. Huang, N. Nemchuk, and R. S. Ruoff, "Patterning of highly oriented pyrolytic graphite by oxygen plasma etching," *Applied Physics Letters*, vol. 75, no. 2, pp. 193–195, 1999.
- [30] X. Lu, M. Yu, H. Huang, and R. S. Ruoff, "Tailoring graphite with the goal of achieving single sheets," *Nanotechnology*, vol. 10, no. 3, p. 269, 1999.
- [31] K. S. Novoselov, A. K. Geim, S. V. Morozov, D.-e. Jiang, Y. Zhang, S. V. Dubonos, I. V. Grigorieva, and A. A. Firsov, "Electric field effect in atomically thin carbon films," *science*, vol. 306, no. 5696, pp. 666–669, 2004.
- [32] H.-P. Boehm, A. Clauss, G. Fischer, and U. Hofmann, "Du"nnste kohlenstoff-folien," *Zeitschrift Fu"r Naturforschung B*, vol. 17, no. 3, pp. 150–153, 1962.
- [33] M. Wissler, "Graphite and carbon powders for electrochemical applications," *Journal of power sources*, vol. 156, no. 2, pp. 142–150, 2006.
- [34] D. Chung, "Review graphite," *Journal of materials science*, vol. 37, no. 8, pp. 1475–1489, 2002.
- [35] M. J. Allen, V. C. Tung, and R. B. Kaner, "Honeycomb carbon: a review of graphene," *Chemical reviews*, vol. 110, no. 1, pp. 132–145, 2010.
- [36] M. Ramezani and O. Rahmani, "A review of recent progress in the graphene syntheses and its applications," *Mechanics of Advanced Materials and Structures*, vol. 32, no. 21, pp. 5256–5288, 2025.
- [37] G. Eda and M. Chhowalla, "Chemically derived graphene oxide: towards large-area thin-film electronics and optoelectronics," *Advanced materials*, vol. 22, no. 22, pp. 2392–2415, 2010.
- [38] D. R. Dreyer, S. Park, C. W. Bielawski, and R. S. Ruoff, "The chemistry of graphene oxide," *Chemical society reviews*, vol. 39, no. 1, pp. 228–240, 2010.
- [39] S. Stankovich, D. A. Dikin, R. D. Piner, K. A. Kohlhaas, A. Kleinhammes, Y. Jia, Y. Wu, S. T. Nguyen, and R. S. Ruoff, "Synthesis of graphene-based nanosheets via chemical reduction of exfoliated graphite oxide," *carbon*, vol. 45, no. 7, pp. 1558–1565, 2007.
- [40] H. C. Schniepp, J.-L. Li, M. J. McAllister, H. Sai, M. Herrera-Alonso, D. H. Adamson, R. K. Prud'homme, R. Car, D. A. Saville, and I. A. Aksay, "Functionalized single graphene sheets derived from splitting graphite oxide," *The journal of physical chemistry B*, vol. 110, no. 17, pp. 8535–8539, 2006.
- [41] Y. Geng, S. J. Wang, and J.-K. Kim, "Preparation of graphite nanoplatelets and graphene sheets," *Journal of colloid and interface science*, vol. 336, no. 2, pp. 592–598, 2009.
- [42] A. Lerf, H. He, M. Forster, and J. Klinowski, "Structure of graphite oxide revisited," *The Journal of Physical Chemistry B*, vol. 102, no. 23, pp. 4477–4482, 1998.

- [43] J. I. Paredes, S. Villar-Rodil, A. Martínez-Alonso, and J. M. Tascon, "Graphene oxide dispersions in organic solvents," *Langmuir*, vol. 24, no. 19, pp. 10560–10564, 2008.
- [44] Y. Wang, Z. Shi, J. Fang, H. Xu, X. Ma, and J. Yin, "Direct exfoliation of graphene in methanesulfonic acid and facile synthesis of graphene/polybenzimidazole nanocomposites," *Journal of Materials Chemistry*, vol. 21, no. 2, pp. 505–512, 2011.
- [45] X. Wang, P. F. Fulvio, G. A. Baker, G. M. Veith, R. R. Unocic, S. M. Mahurin, M. Chi, and S. Dai, "Direct exfoliation of natural graphite into micrometre size few layers graphene sheets using ionic liquids," *Chemical Communications*, vol. 46, no. 25, pp. 4487–4489, 2010.
- [46] W. W. Liu and J. N. Wang, "Direct exfoliation of graphene in organic solvents with addition of naoh," *Chemical communications*, vol. 47, no. 24, pp. 6888–6890, 2011.
- [47] Y. Zhu, S. Murali, W. Cai, X. Li, J. W. Suk, J. R. Potts, and R. S. Ruoff, "Graphene and graphene oxide: synthesis, properties, and applications," *Advanced materials*, vol. 22, no. 35, pp. 3906–3924, 2010.
- [48] D. W. Boukhvalov and M. I. Katsnelson, "Modeling of graphite oxide," *Journal of the American Chemical Society*, vol. 130, no. 32, pp. 10697–10701, 2008.
- [49] H. Chang and H. Wu, "Graphene-based nanomaterials: Synthesis, properties, and optical and optoelectronic applications," *Advanced Functional Materials*, vol. 23, no. 16, pp. 1984–1997, 2013.
- [50] X. Du, I. Skachko, A. Barker, and E. Y. Andrei, "Approaching ballistic transport in suspended graphene," *Nature nanotechnology*, vol. 3, no. 8, pp. 491–495, 2008.
- [51] X. Li, X. Wang, L. Zhang, S. Lee, and H. Dai, "Chemically derived, ultrasmooth graphene nanoribbon semiconductors," *science*, vol. 319, no. 5867, pp. 1229–1232, 2008.
- [52] D. V. Kosynkin, A. L. Higginbotham, A. Sinitskii, J. R. Lomeda, A. Dimiev, B. K. Price, and J. M. Tour, "Longitudinal unzipping of carbon nanotubes to form graphene nanoribbons," *Nature*, vol. 458, no. 7240, pp. 872–876, 2009.
- [53] J. Bai, X. Zhong, S. Jiang, Y. Huang, and X. Duan, "Graphene nanomesh," *Nature nanotechnology*, vol. 5, no. 3, pp. 190–194, 2010.
- [54] Y. Kopelevich and P. Esquinazi, "Graphene physics in graphite," *Advanced Materials*, vol. 19, no. 24, pp. 4559–4563, 2007.
- [55] H. A. Becerril, J. Mao, Z. Liu, R. M. Stoltenberg, Z. Bao, and Y. Chen, "Evaluation of solution-processed reduced graphene oxide films as transparent conductors," *ACS nano*, vol. 2, no. 3, pp. 463–470, 2008.

- [56] S. Berber, Y.-K. Kwon, and D. Tománek, “Unusually high thermal conductivity of carbon nanotubes,” *Physical review letters*, vol. 84, no. 20, p. 4613, 2000.
- [57] A. A. Balandin, S. Ghosh, W. Bao, I. Calizo, D. Teweldebrhan, F. Miao, and C. N. Lau, “Superior thermal conductivity of single-layer graphene,” *Nano letters*, vol. 8, no. 3, pp. 902–907, 2008.
- [58] A. A. Balandin, “Thermal properties of graphene and nanostructured carbon materials,” *Nature materials*, vol. 10, no. 8, pp. 569–581, 2011.
- [59] S. Ghosh, I. Calizo, D. Teweldebrhan, E. P. Pokatilov, D. L. Nika, A. A. Balandin, W. Bao, F. Miao, and C. N. Lau, “Extremely high thermal conductivity of graphene: Prospects for thermal management applications in nanoelectronic circuits,” *Applied Physics Letters*, vol. 92, no. 15, 2008.
- [60] J. H. Seol, I. Jo, A. L. Moore, L. Lindsay, Z. H. Aitken, M. T. Pettes, X. Li, Z. Yao, R. Huang, D. Broido, *et al.*, “Two-dimensional phonon transport in supported graphene,” *Science*, vol. 328, no. 5975, pp. 213–216, 2010.
- [61] T. Schwamb, B. R. Burg, N. C. Schirmer, and D. Poulikakos, “An electrical method for the measurement of the thermal and electrical conductivity of reduced graphene oxide nanostructures,” *Nanotechnology*, vol. 20, no. 40, p. 405704, 2009.
- [62] N. K. Mahanta and A. R. Abramson, “Thermal conductivity of graphene and graphene oxide nanoplatelets,” in *13th intersociety conference on thermal and thermomechanical phenomena in electronic systems*, pp. 1–6, IEEE, 2012.
- [63] D. C. Marcano, D. V. Kosynkin, J. M. Berlin, A. Sinitskii, Z. Sun, A. Slesarev, L. B. Alemany, W. Lu, and J. M. Tour, “Improved synthesis of graphene oxide,” *ACS nano*, vol. 4, no. 8, pp. 4806–4814, 2010.
- [64] Q. Zheng, Y. Geng, S. Wang, Z. Li, and J.-K. Kim, “Effects of functional groups on the mechanical and wrinkling properties of graphene sheets,” *Carbon*, vol. 48, no. 15, pp. 4315–4322, 2010.
- [65] F. Liu, P. Ming, and J. Li, “Ab initio calculation of ideal strength and phonon instability of graphene under tension,” *Physical Review B—Condensed Matter and Materials Physics*, vol. 76, no. 6, p. 064120, 2007.
- [66] J. W. Suk, R. D. Piner, J. An, and R. S. Ruoff, “Mechanical properties of monolayer graphene oxide,” *ACS nano*, vol. 4, no. 11, pp. 6557–6564, 2010.
- [67] X. Shen, X. Lin, N. Yousefi, J. Jia, and J.-K. Kim, “Wrinkling in graphene sheets and graphene oxide papers,” *Carbon*, vol. 66, pp. 84–92, 2014.
- [68] Q. Pei, Y. Zhang, and V. Shenoy, “A molecular dynamics study of the mechanical properties of hydrogen functionalized graphene,” *Carbon*, vol. 48, no. 3, pp. 898–904, 2010.

- [69] Q.-X. Pei, Y.-W. Zhang, and V. B. Shenoy, "Mechanical properties of methyl functionalized graphene: a molecular dynamics study," *Nanotechnology*, vol. 21, no. 11, p. 115709, 2010.
- [70] K. Scrivener, A. Ouzia, P. Juilland, and A. K. Mohamed, "Advances in understanding cement hydration mechanisms," *Cement and Concrete Research*, vol. 124, p. 105823, 2019.
- [71] J. W. Bullard, H. M. Jennings, R. A. Livingston, A. Nonat, G. W. Scherer, J. S. Schweitzer, K. L. Scrivener, and J. J. Thomas, "Mechanisms of cement hydration," *Cement and concrete research*, vol. 41, no. 12, pp. 1208–1223, 2011.
- [72] P. Akarsh, D. Shrinidhi, S. Marathe, and A. K. Bhat, "Graphene oxide as nano-material in developing sustainable concrete—a brief review," *Materials Today: Proceedings*, vol. 60, pp. 234–246, 2022.
- [73] K. Xu, J. Yang, H. He, J. Wei, and Y. Zhu, "Influences of additives on the rheological properties of cement composites: A review of material impacts," *Materials*, vol. 18, no. 8, p. 1753, 2025.
- [74] R. Mohan, G. S. Ruby, and I. Padmanaban, "Synthesis of graphene oxide and study on strength properties of graphene oxide in cement mortar," in *5TH INTERNATIONAL CONFERENCE ON INNOVATIVE DESIGN, ANALYSIS & DEVELOPMENT PRACTICES IN AEROSPACE & AUTOMOTIVE ENGINEERING: I-DAD'22*, vol. 2766, p. 020093, AIP Publishing LLC, 2023.
- [75] D. Liao, D. Li, S. Zhou, X. Zhang, and Y. Fang, "Study on the hydration and physical properties of cement by m18 polycarboxylate superplasticizer modified graphene oxide," *Journal of Renewable Materials*, vol. 11, no. 2, p. 625, 2023.
- [76] Y. Chen, G. Li, L. Li, W. Zhang, and K. Dong, "Molecular dynamics simulation and experimental study on mechanical properties and microstructure of cement-based composites enhanced by graphene oxide and graphene," *Molecular Simulation*, vol. 49, no. 3, pp. 251–262, 2023.
- [77] S. Devi and R. Khan, "Effect of graphene oxide on mechanical and durability performance of concrete," *Journal of Building Engineering*, vol. 27, p. 101007, 2020.
- [78] P. Rao, J. Prakash, R. Alexander, M. Shinde, and K. Dasgupta, "Role of graphene oxide infusion in concrete to elevate strength and fire performance in construction concrete," *Diamond and Related Materials*, vol. 147, p. 111269, 2024.
- [79] Q. Ma, R. Guo, Z. Zhao, Z. Lin, and K. He, "Mechanical properties of concrete at high temperature—a review," *Construction and Building Materials*, vol. 93, pp. 371–383, 2015.
- [80] P. Li, J. Liu, H. Suh, E. Z. Nezhad, and S. Bae, "Understanding the role of graphene oxide nanoribbons—functionalized carbon nanotubes—graphene oxide

- (gnfg) complex in enhancing the fire resistance of cementitious composites,” *Construction and Building Materials*, vol. 348, p. 128637, 2022.
- [81] T. Z. Harmathy, “Fire safety design and concrete,” (*No Title*), 1993.
- [82] L. Zhang, G. Zhou, Y. Han, H. Lin, and Y. Wu, “Application of internet of things technology and convolutional neural network model in bridge crack detection,” *Ieee Access*, vol. 6, pp. 39442–39451, 2018.
- [83] Y.-J. Cha, W. Choi, and O. Bu“yu“k“oztu“rk, “Deep learning-based crack damage detection using convolutional neural networks,” *Computer-Aided Civil and Infrastructure Engineering*, vol. 32, no. 5, pp. 361–378, 2017.
- [84] M. Flah, A. R. Suleiman, and M. L. Nehdi, “Classification and quantification of cracks in concrete structures using deep learning image-based techniques,” *Cement and Concrete Composites*, vol. 114, p. 103781, 2020.
- [85] S. Li and X. Zhao, “Image-based concrete crack detection using convolutional neural network and exhaustive search technique,” *Advances in civil engineering*, vol. 2019, no. 1, p. 6520620, 2019.
- [86] D. Khalili, “Graphene oxide: a promising carbocatalyst for the regioselective thiocyanation of aromatic amines, phenols, anisols and enolizable ketones by hydrogen peroxide/kscn in water,” *New Journal of Chemistry*, vol. 40, no. 3, pp. 2547–2553, 2016.
- [87] L. Wang, S. Zhang, D. Zheng, H. Yang, H. Cui, W. Tang, and D. Li, “Effect of graphene oxide (go) on the morphology and microstructure of cement hydration products,” *Nanomaterials*, vol. 7, no. 12, p. 429, 2017.
- [88] G. Jing, J. Xu, J. Wu, S. Wang, X. Lu, X. Cheng, and Z. Ye, “Improving the cracking resistance of mortar by reduced graphene oxide,” *Construction and Building Materials*, vol. 310, p. 125150, 2021.