

## REFERENCES

- ❖ Agarwal, C. V., Verma, V. K., & Singh, R. S. (1980). The assessment of dithiocarbamates as extreme pressure lubricant additives. *Wear*, 64(1), 33-38.
- ❖ Alazemi, A. A., Dysart, A. D., Phuah, X. L., Pol, V. G., & Sadeghi, F. (2016a). MoS<sub>2</sub> nanolayer coated carbon spheres as an oil additive for enhanced tribological performance. *Carbon*, 110, 367-377.
- ❖ Alazemi, A. A., Etacheri, V., Dysart, A. D., Stacke, L. E., Pol, V. G., & Sadeghi, F. (2015). Ultrasmooth submicrometer carbon spheres as lubricant additives for friction and wear reduction. *ACS Applied Materials & Interfaces*, 7(9), 5514-5521.
- ❖ Anacona, J. R., Bastardo, E., & Camus, J. (1999). Manganese (II) and palladium (II) complexes containing a new macrocyclic Schiff base ligand: antibacterial properties. *Transition Metal Chemistry*, 24(4), 478-480.
- ❖ Astruc, D., Boisselier, E., & Ornelas, C. (2010). Dendrimers designed for functions: from physical, photophysical, and supramolecular properties to applications in sensing, catalysis, molecular electronics, photonics, and nanomedicine. *Chemical reviews*, 110(4), 1857-1959.
- ❖ Azouz, A., & Rowson, D. M. (1981). A comparison of techniques for surface analysis of extreme pressure films formed during wear tests. In *Tribology Series* (Vol. 7, pp. 763-778). Elsevier.
- ❖ Baldwin, B. A. (1976). Relationship between surface composition and wear: an X-ray photoelectron spectroscopic study of surfaces tested with organosulfur compounds. *ASLE TRANSACTIONS*, 19(4), 335-344.

- ❖ Battez, A. H., González, R., Viesca, J. L., Fernández, J. E., Fernández, J. D., Machado, A., ... & Riba, J. (2008a). CuO, ZrO<sub>2</sub> and ZnO nanoparticles as antiwear additive in oil lubricants. *Wear*, 265(3-4), 422-428.
- ❖ Battez, A. H., Viesca, J. L., González, R., Blanco, D., Asedegbega, E., & Osorio, A. (2010). Friction reduction properties of a CuO nanolubricant used as lubricant for a NiCrBSi coating. *Wear*, 268(1-2), 325-328.
- ❖ Bhattacharya, A., Singh, T., Verma, V. K., & Prasad, N. (1995). 1, 3, 4-Thiadiazoles as potential EP additives—a tribological evaluation using a four-ball test. *Tribology international*, 28(3), 189-194.
- ❖ Bhushan, B. (2001a). *Modern tribology handbook. 1. Principles of tribology*. CRC press.
- ❖ Bhushan, B. (2001b). Nano-to microscale wear and mechanical characterization using scanning probe microscopy. *Wear*, 251(1-12), 1105-1123.
- ❖ Bhushan, B., Israelachvili, J. N., & Landman, U. (1995). Nanotribology: friction, wear and lubrication at the atomic scale. *Nature*, 374(6523), 607-616.
- ❖ Biresaw, G., Asadauskas, S. J., & McClure, T. G. (2012). Polysulfide and biobased extreme pressure additive performance in vegetable vs paraffinic base oils. *Industrial & engineering chemistry research*, 51(1), 262-273.
- ❖ Cavdar, B., & Ludema, K. C. (1991). Dynamics of dual film formation in boundary lubrication of steels part I. Functional nature and mechanical properties.
- ❖ Chatterjee, A. K., Chakraborty, R., & Basu, T. (2014). Mechanism of antibacterial activity of copper nanoparticles. *Nanotechnology*, 25(13), 135101.

- ❖ Chen, S., & Liu, W. (2006). Oleic acid capped PbS nanoparticles: synthesis, characterization and tribological properties. *Materials Chemistry and Physics*, 98(1), 183-189.
- ❖ Chen, W. X., Li, F., Han, G., Xia, J. B., Wang, L. Y., Tu, J. P., & Xu, Z. D. (2003). Tribological behavior of carbon-nanotube-filled PTFE composites. *Tribology Letters*, 15(3), 275-278.
- ❖ Chou, R., Battez, A. H., Cabello, J. J., Viesca, J. L., Osorio, A., & Sagastume, A. (2010). Tribological behavior of polyalphaolefin with the addition of nickel nanoparticles. *Tribology International*, 43(12), 2327-2332.
- ❖ Croudace, M. C. (1991). U.S. Patent No. 4,990,273. Washington, DC: U.S. Patent and Trademark Office.
- ❖ Davey, W., & Edwards, E. D. (1958). The extreme-pressure lubricating properties of some sulphides and disulphides, in mineral oil, as assessed by the Four-Ball Machine. *Wear*, 1(4), 291-304.
- ❖ David, M. (2002). GF-4 engine oil spec unveiled. *Lube Report*, 3(31), 1.
- ❖ De, B., Balamurugan, J., Kim, N. H., & Lee, J. H. (2017). Enhanced electrochemical and photocatalytic performance of core-shell CuS@ carbon quantum dots@ carbon hollow nanospheres. *ACS applied materials & interfaces*, 9(3), 2459-2468.
- ❖ Delgado, K., Quijada, R., Palma, R., & Palza, H. (2011). Polypropylene with embedded copper metal or copper oxide nanoparticles as a novel plastic antimicrobial agent. *Letters in applied microbiology*, 53(1), 50-54.

- ❖ Dewar, M. J., & Thiel, W. (1977). Ground states of molecules. 38. The MNDO method. Approximations and parameters. *Journal of the American Chemical Society*, 99(15), 4899-4907.
- ❖ Didziulis, S. V. (1995). An XPS study of the chemical interactions of the extreme pressure lubricant additive lead naphthenate with titanium and titanium compound surfaces. *Langmuir*, 11(3), 917-930.
- ❖ Dorinson, A., & Ludema, K. C. (1985). *Mechanics and chemistry in lubrication* (Vol. 9). Elsevier.
- ❖ Erdemir, A., & Donnet, C. (2006). Tribology of diamond-like carbon films: recent progress and future prospects. *Journal of Physics D: Applied Physics*, 39(18), R311.
- ❖ Forbes, E. S. (1970). Antiwear and extreme pressure additives for lubricants. *Tribology*, 3(3), 145-152.
- ❖ Forbes, E. S., & Reid, A. J. D. (1973). Liquid phase adsorption/reaction studies of organo-sulfur compounds and their load-carrying mechanism. *Asle Transactions*, 16(1), 50-60.
- ❖ Fu, X., Sun, L., Zhou, X., Li, Z., & Ren, T. (2015). Tribological study of oil-miscible quaternary ammonium phosphites ionic liquids as lubricant additives in PAO. *Tribology Letters*, 60(2), 23.
- ❖ Gara, L., & Zou, Q. (2012). Friction and wear characteristics of water-based ZnO and Al<sub>2</sub>O<sub>3</sub> nanofluids. *Tribology Transactions*, 55(3), 345-350.
- ❖ Giacalone, F., & Gruttaduria, M. (2016). Covalently supported ionic liquid phases: an advanced class of recyclable catalytic systems. *ChemCatChem*, 8(4), 664-684.

- ❖ Golcu, A., Tumer, M., Demirelli, H., & Wheatley, R. A. (2005). Cd (II) and Cu (II) complexes of polydentate Schiff base ligands: synthesis, characterization, properties and biological activity. *Inorganica Chimica Acta*, 358(6), 1785-1797.
- ❖ Gu, K., Chen, B., Wang, X., Wang, J., Fang, J., Wu, J., & Yang, X. (2014). Preparation, friction, and wear behaviors of cerium-doped anatase nanophases in rapeseed oil. *Industrial & Engineering Chemistry Research*, 53(15), 6249-6254.
- ❖ Guo, X., Hao, C., Jin, G., Zhu, H. Y., & Guo, X. Y. (2014). Copper nanoparticles on graphene support: an efficient photocatalyst for coupling of nitroaromatics in visible light. *Angewandte Chemie International Edition*, 53(7), 1973-1977.
- ❖ Gusain, R., Mungse, H. P., Kumar, N., Ravindran, T. R., Pandian, R., Sugimura, H., & Khatri, O. P. (2016). Covalently attached graphene–ionic liquid hybrid nanomaterials: synthesis, characterization and tribological application. *Journal of Materials Chemistry A*, 4(3), 926-937.
- ❖ Gusain, R., Singh, R., Sivakumar, K. L. N., & Khatri, O. P. (2014). Halogen-free imidazolium/ammonium-bis (salicylato) borate ionic liquids as high performance lubricant additives. *Rsc Advances*, 4(3), 1293-1301.
- ❖ Hartley, R. J., & Waddoups, M. (2002). U.S. Patent No. 6,500,786. Washington, DC: U.S. Patent and Trademark Office.
- ❖ He, Z., Rao, W., Ren, T., Liu, W., & Xue, Q. (2002). The tribochemical study of some N-containing heterocyclic compounds as lubricating oil additives. *Tribology Letters*, 13(2), 87-93.

- ❖ He, Z., Wu, Y., Lei, J., Xiong, L., Qiu, J., & Fu, X. (2014). Tribological property study of novel water-soluble triazine derivative. *Proceedings of the Institution of Mechanical Engineers, Part J: Journal of Engineering Tribology*, 228(4), 445-453.
- ❖ Hea, Z., Raoa, W., Rena, T., Liub, W., & Xue, Q. (2002). The tribocatalytic study of some N-containing heterocyclic compounds. *Tribol. Lett.*, 13(2).
- ❖ Hodyna, D., Bardeau, J. F., Metelytsia, L., Riabov, S., Kobra, L., Laptiy, S., ... & Rogalsky, S. (2016). Efficient antimicrobial activity and reduced toxicity of 1-dodecyl-3-methylimidazolium tetrafluoroborate ionic liquid/β-cyclodextrin complex. *Chemical Engineering Journal*, 284, 1136-1145.
- ❖ Hu, Z. S., Dong, J. X., Chen, G. X., & He, J. Z. (2000). Preparation and tribological properties of nanoparticle lanthanum borate. *Wear*, 243(1-2), 43-47.
- ❖ Hua, W., Jing, L., Hongling, Y., Xiangqiong, Z., Lingbo, L., & Tianhui, R. (2007). The tribological behavior of diester-containing polysulfides as additives in mineral oil. *Tribology international*, 40(8), 1246-1252.
- ❖ Huang, W., Du, C., Li, Z., Liu, M., & Liu, W. (2006). Tribological characteristics of magnesium alloy using N-containing compounds as lubricating additives during sliding. *Wear*, 260(1-2), 140-148.
- ❖ Ingole, S., Charanpahari, A., Kakade, A., Umare, S. S., Bhatt, D. V., & Menghani, J. (2013). Tribological behavior of nano TiO<sub>2</sub> as an additive in base oil. *Wear*, 301(1-2), 776-785.
- ❖ Jaiswal, V., Gupta, S. R., Rastogi, R. B., Kumar, R., & Singh, V. P. (2015). Evaluation of antiwear activity of substituted benzoylhydrazones and their

copper (II) complexes in paraffin oil as efficient low SAPS additives and their interactions with the metal surface using density functional theory. *Journal of Materials Chemistry A*, 3(9), 5092-5109.

- ❖ Jaiswal, V., Rastogi, R. B., & Kumar, R. (2014). Tribological studies of some SAPS-free Schiff bases derived from 4-aminoantipyrine and aromatic aldehydes and their synergistic interaction with borate ester. *Journal of Materials Chemistry A*, 2(27), 10424-10434.
- ❖ Jaiswal, V., Rastogi, R. B., Kumar, R., Singh, L., & Mandal, K. D. (2014). Tribological studies of stearic acid-modified CaCu 2.9 Zn 0.1 Ti 4 O 12 nanoparticles as effective zero SAPS antiwear lubricant additives in paraffin oil. *Journal of Materials Chemistry A*, 2(2), 375-386.
- ❖ Jaiswal, V., Rastogi, R. B., Maurya, J. L., Singh, P., & Tewari, A. K. (2014). Quantum chemical calculation studies for interactions of antiwear lubricant additives with metal surfaces. *RSC Advances*, 4(26), 13438-13445.
- ❖ Jia, X., Huang, J., Li, Y., Yang, J., & Song, H. (2019). Monodisperse Cu nanoparticles@ MoS<sub>2</sub> nanosheets as a lubricant additive for improved tribological properties. *Applied Surface Science*, 494, 430-439.
- ❖ Jia, Z., Xia, Y., Pang, X., & Hao, J. (2011). Tribological behaviors of different diamond-like carbon coatings on nitrided mild steel lubricated with benzotriazole-containing borate esters. *Tribology Letters*, 41(1), 247-256.
- ❖ Jiménez, A. E., & Bermúdez, M. D. (2008). Imidazolium ionic liquids as additives of the synthetic ester propylene glycol dioleate in aluminium–steel lubrication. *Wear*, 265(5-6), 787-798.

- ❖ Jiménez, A. E., Bermúdez, M. D., Iglesias, P., Carrión, F. J., & Martínez-Nicolás, G. (2006). 1-N-alkyl-3-methylimidazolium ionic liquids as neat lubricants and lubricant additives in steel–aluminium contacts. *Wear*, 260(7-8), 766-782.
- ❖ Joly-Pottuz, L., Vacher, B., Ohmae, N., Martin, J. M., & Epicier, T. (2008). Anti-wear and friction reducing mechanisms of carbon nano-onions as lubricant additives. *Tribology Letters*, 30(1), 69-80.
- ❖ Jones, M. H., & Scott, D. (Eds.). (1983). *Industrial tribology: the practical aspects of friction, lubrication and wear* (Vol. 8). Elsevier.
- ❖ Kang, X., Wang, B., Zhu, L., & Zhu, H. (2008). Synthesis and tribological property study of oleic acid-modified copper sulfide nanoparticles. *Wear*, 265(1-2), 150-154.
- ❖ Karakulina, A., Gopakumar, A., Akçok, İ., Roulier, B. L., LaGrange, T., Katsyuba, S. A., ... & Dyson, P. J. (2016). A rhodium nanoparticle–lewis acidic ionic liquid catalyst for the chemoselective reduction of heteroarenes. *Angewandte Chemie*, 128(1), 300-304.
- ❖ Kecheng, G. U., Boshui, C., & Yong, C. (2013). Preparation and tribological properties of lanthanum-doped TiO<sub>2</sub> nanoparticles in rapeseed oil. *Journal of Rare Earths*, 31(6), 589-594.
- ❖ Khare, V., Pham, M. Q., Kumari, N., Yoon, H. S., Kim, C. S., Park, J. I., & Ahn, S. H. (2013). Graphene–ionic liquid based hybrid nanomaterials as novel lubricant for low friction and wear. *ACS applied materials & interfaces*, 5(10), 4063-4075.

- ❖ Kheireddin, B. A., Lu, W., Chen, I. C., & Akbulut, M. (2013). Inorganic nanoparticle-based ionic liquid lubricants. *Wear*, 303(1-2), 185-190.
- ❖ Kim, B., Jiang, J. C., & Aswath, P. B. (2011). Mechanism of wear at extreme load and boundary conditions with ashless anti-wear additives: Analysis of wear surfaces and wear debris. *Wear*, 270(3-4), 181-194.
- ❖ Kinoshita, H., Ono, H., Alias, A. A., Nishina, Y., & Fujii, M. (2015). Tribological properties of graphene oxide as a lubricating additive in water and lubricating oils. *Mechanical Engineering Journal*, 15-00323.
- ❖ Kumar, N., Kozakov, A. T., Sidashov, A. V., & Nicolskii, A. V. (2019). Tribofilm stability of ionic liquid functionalized graphene-oxide in metallic contact interfaces. *Journal of Molecular Liquids*, 296, 111813.
- ❖ Kumara, C., Leonard, D. N., Meyer, H. M., Luo, H., Armstrong, B. L., & Qu, J. (2018). Palladium nanoparticle-enabled ultrathick tribofilm with unique composition. *ACS applied materials & interfaces*, 10(37), 31804-31812.
- ❖ Lara, J., Blunt, T., Kotvis, P., Riga, A., & Tysoe, W. T. (1998). Surface chemistry and extreme-pressure lubricant properties of dimethyl disulfide. *The Journal of Physical Chemistry B*, 102(10), 1703-1709.
- ❖ Lee, J., Cho, S., Hwang, Y., Lee, C., & Kim, S. H. (2007). Enhancement of lubrication properties of nano-oil by controlling the amount of fullerene nanoparticle additives. *Tribology Letters*, 28(2), 203-208.
- ❖ Li, J., Ren, T., Liu, H., Wang, D., & Liu, W. (2000). The tribological study of a tetrazole derivative as additive in liquid paraffin. *Wear*, 246(1-2), 130-133.

- ❖ Li, Y., Zhao, J., Tang, C., He, Y., Wang, Y., Chen, J., ... & Luo, J. (2016). Highly exfoliated reduced graphite oxide powders as efficient lubricant oil additives. *Advanced Materials Interfaces*, 3(22), 1600700.
- ❖ Li, Z., & Ren, T. (2017). Synergistic effects between alkylphosphate-ammonium ionic liquid and alkylphenylborate as lubricant additives in rapeseed oil. *Tribology International*, 109, 373-381.
- ❖ Li, Z., Hou, X., Yu, L., Zhang, Z., & Zhang, P. (2014). Preparation of lanthanum trifluoride nanoparticles surface-capped by tributyl phosphate and evaluation of their tribological properties as lubricant additive in liquid paraffin. *Applied surface science*, 292, 971-977.
- ❖ Liu, G., Li, X., Qin, B., Xing, D., Guo, Y., & Fan, R. (2004). Investigation of the mending effect and mechanism of copper nano-particles on a tribologically stressed surface. *Tribology Letters*, 17(4), 961-966.
- ❖ Liu, J., Wickramaratne, N. P., Qiao, S. Z., & Jaroniec, M. (2015). Molecular-based design and emerging applications of nanoporous carbon spheres. *Nature materials*, 14(8), 763-774.
- ❖ Liu, M., Ma, X., Gan, L., Xu, Z., Zhu, D., & Chen, L. (2014). A facile synthesis of a novel mesoporous Ge@C sphere anode with stable and high capacity for lithium ion batteries. *Journal of Materials Chemistry A*, 2(40), 17107-17114.
- ❖ Liu, W., Ye, C., Gong, Q., Wang, H., & Wang, P. (2002). Tribological performance of room-temperature ionic liquids as lubricant. *Tribology Letters*, 13(2), 81-85.

- ❖ Liu, X., Huang, Z., Tang, W., & Wang, B. (2017). Remarkable lubricating effect of ionic liquid modified carbon dots as a kind of water-based lubricant additives. *Nano*, 12(09), 1750108.
- ❖ Lv, H., Guo, Y., Zhao, Y., Zhang, H., Zhang, B., Ji, G., & Xu, Z. J. (2016). Achieving tunable electromagnetic absorber via graphene/carbon sphere composites. *Carbon*, 110, 130-137.
- ❖ Ma, J., Mo, Y., & Bai, M. (2009). Effect of Ag nanoparticles additive on the tribological behavior of multialkylated cyclopentanes (MACs). *Wear*, 266(7-8), 627-631.
- ❖ Mahrova, M., Pagano, F., Pejakovic, V., Valea, A., Kalin, M., Igartua, A., & Tojo, E. (2015). Pyridinium based dicationic ionic liquids as base lubricants or lubricant additives. *Tribology International*, 82, 245-254.
- ❖ Makinson, K. R., & Tabor, D. (1964). The friction and transfer of polytetrafluoroethylene. *Proceedings of the Royal Society of London. Series A. Mathematical and Physical Sciences*, 281(1384), 49-61.
- ❖ Mammen, A., Verma, V. K., & Agarwal, C. V. (1983). Mechanism of EP additive-metal interaction: Assessment of certain S-benzylisothiocarbamides. *Tribology international*, 16(6), 291-296.
- ❖ Mammen, A., Verma, V. K., & Agarwal, C. V. (1984). The ep performance of certain S-benzylisoformamidinothiocarbamides in the four-ball test. *Tribology international*, 17(5), 289-292.
- ❖ Mangolini, F., Rossi, A., & Spencer, N. D. (2009). Reactivity of triphenyl phosphorothionate in lubricant oil solution. *Tribology letters*, 35(1), 31-43.

- ❖ Martin, J. M., & Ohmae, N. (2008). *Nanolubricants* (Vol. 13). John Wiley & Sons.
- ❖ Migowski, P., & Dupont, J. (2007). Catalytic applications of metal nanoparticles in imidazolium ionic liquids. *Chemistry—A European Journal*, 13(1), 32-39.
- ❖ Minami, I. (2009). Ionic liquids in tribology. *Molecules*, 14(6), 2286-2305.
- ❖ Ming, H., Ming, J., Kwak, W. J., Yang, W., Zhou, Q., Zheng, J., & Sun, Y. K. (2015). Fluorine-doped porous carbon-decorated Fe<sub>3</sub>O<sub>4</sub>-FeF<sub>2</sub> composite versus LiNi<sub>0.5</sub>Mn<sub>1.5</sub>O<sub>4</sub> towards a full battery with robust capability. *Electrochimica Acta*, 169, 291-299.
- ❖ Mirin, N. A., Ali, T. A., Nordlander, P., & Halas, N. J. (2010). Perforated semishells: far-field directional control and optical frequency magnetic response. *Acs Nano*, 4(5), 2701-2712.
- ❖ Mistry, K. K., Pol, V. G., Thackeray, M. M., Wen, J., Miller, D. J., & Erdemir, A. (2015). Synthesis and tribology of micro-carbon sphere additives for enhanced lubrication. *Tribology Transactions*, 58(3), 474-480.
- ❖ Mosey, N. J., & Woo, T. K. (2003). Finite temperature structure and dynamics of zinc dialkyldithiophosphate wear inhibitors: A density functional theory and ab initio molecular dynamics study. *The Journal of Physical Chemistry A*, 107(25), 5058-5070.
- ❖ Mou, Z., Wang, B., Lu, H., Dai, S., & Huang, Z. (2019). Synthesis of poly (ionic liquid)s brush-grafted carbon dots for high-performance lubricant additives of polyethylene glycol. *Carbon*, 154, 301-312.

- ❖ Mutahir, S., Khan, M. A., Khan, I. U., Yar, M., Ashraf, M., Tariq, S., ... & Zhou, B. J. (2017). Organocatalyzed and mechanochemical solvent-free synthesis of novel and functionalized bis-biphenyl substituted thiazolidinones as potent tyrosinase inhibitors: SAR and molecular modeling studies. *European journal of medicinal chemistry*, 134, 406-414.
- ❖ Najman, M. N., Kasrai, M., & Bancroft, G. M. (2003). X-ray absorption spectroscopy and atomic force microscopy of films generated from organosulfur extreme-pressure (EP) oil additives. *Tribology Letters*, 14(4), 225-235.
- ❖ Najman, M. N., Kasrai, M., & Bancroft, G. M. (2004). Chemistry of antiwear films from ashless thiophosphate oil additives. *Tribology Letters*, 17(2), 217-229.
- ❖ Najman, M. N., Kasrai, M., Bancroft, G. M., Frazer, B. H., & De Stasio, G. (2004). The correlation of microchemical properties to antiwear (AW) performance in ashless thiophosphate oil additives. *Tribology Letters*, 17(4), 811-822.
- ❖ Padgurskas, J., Rukuiza, R., Prosyčėvas, I., & Kreivaitis, R. (2013). Tribological properties of lubricant additives of Fe, Cu and Co nanoparticles. *Tribology International*, 60, 224-232.
- ❖ Palacio, M., & Bhushan, B. (2010). A review of ionic liquids for green molecular lubrication in nanotechnology. *Tribology Letters*, 40(2), 247-268.
- ❖ Pei, F., An, T., Zang, J., Zhao, X., Fang, X., Zheng, M., ... & Zheng, N. (2016). From hollow carbon spheres to N-doped hollow porous carbon bowls: rational

design of hollow carbon host for Li-S batteries. *Advanced Energy Materials*, 6(8), 1502539.

- ❖ Peng, Y., Wang, Z., & Zou, K. (2015). Friction and wear properties of different types of graphene nanosheets as effective solid lubricants. *Langmuir*, 31(28), 7782-7791.
- ❖ Perkin, S. (2012). Ionic liquids in confined geometries. *Physical Chemistry Chemical Physics*, 14(15), 5052-5062.
- ❖ Perkin, S., Albrecht, T., & Klein, J. (2010). Layering and shear properties of an ionic liquid, 1-ethyl-3-methylimidazolium ethylsulfate, confined to nano-films between mica surfaces. *Physical chemistry chemical physics*, 12(6), 1243-1247.
- ❖ Philippon, D., De Barros-Bouchet, M. I., Lerasle, O., Le Mogne, T., & Martin, J. M. (2011). Experimental simulation of tribochemical reactions between borates esters and steel surface. *Tribology letters*, 41(1), 73-82.
- ❖ Plimpton, S. (1995). Fast parallel algorithms for short-range molecular dynamics. *Journal of computational physics*, 117(1), 1-19.
- ❖ Qiao, R., Li, J., Wu, H., Ren, T., Zhao, Y., & Ma, C. (2011). The tribological chemistry of the triazine derivative additives in rape seed oil and synthetic diester. *Applied Surface Science*, 257(9), 3843-3849.
- ❖ Quan, X., Zhang, S., Hu, M., Gao, X., Jiang, D., & Sun, J. (2017). Tribological properties of WS<sub>2</sub>/MoS<sub>2</sub>-Ag composite films lubricated with ionic liquids under vacuum conditions. *Tribology International*, 115, 389-396.
- ❖ Ramasamy, V., Mohana, V., & Rajendran, V. (2018). Characterization of Ca doped CeO<sub>2</sub> quantum dots and their applications in photocatalytic degradation. *OpenNano*, 3, 38-47.

- ❖ Ramyadevi, J., Jeyasubramanian, K., Marikani, A., Rajakumar, G., & Rahuman, A. A. (2012). Synthesis and antimicrobial activity of copper nanoparticles. *Materials letters*, 71, 114-116.
- ❖ Rastogi, R. B., & Kumar, D. (2016). Synthesis, characterization, and tribological evaluation of SDS-stabilized magnesium-doped zinc oxide (Zn0.88Mg0.12O) nanoparticles as efficient antiwear lubricant additives. *ACS Sustainable Chemistry & Engineering*, 4(6), 3420-3428.
- ❖ Rastogi, R. B., Jaiswal, V., & Maurya, J. L. (2014). Theoretical study of Schiff base compounds as antiwear lubricant additives: A quantum chemical calculation approach. *Proceedings of the Institution of Mechanical Engineers, Part J: Journal of Engineering Tribology*, 228(2), 198-205.
- ❖ Rastogi, R. B., Maurya, J. L., & Jaiswal, V. (2013). Low sulfur, phosphorus and metal free antiwear additives: synergistic action of salicylaldehyde N (4)-phenylthiosemicarbazones and its different derivatives with Vanlube 289 additive. *Wear*, 297(1-2), 849-859.
- ❖ Ratoi, M., Niste, V. B., & Zekonyte, J. (2014). WS 2 nanoparticles—potential replacement for ZDDP and friction modifier additives. *RSC Advances*, 4(41), 21238-21245.
- ❖ Rawat, S. S., Harsha, A. P., Das, S., & Deepak, A. P. (2020). Effect of CuO and ZnO Nano-Additives on the Tribological Performance of Paraffin Oil-Based Lithium Grease. *Tribology Transactions*, 63(1), 90-100.
- ❖ Ray, S. C., Saha, A., Jana, N. R., & Sarkar, R. (2009). Fluorescent carbon nanoparticles: synthesis, characterization, and bioimaging application. *The Journal of Physical Chemistry C*, 113(43), 18546-18551.

- ❖ Reske, R., Mistry, H., Behafarid, F., Roldan Cuenya, B., & Strasser, P. (2014). Particle size effects in the catalytic electroreduction of CO<sub>2</sub> on Cu nanoparticles. *Journal of the American Chemical Society*, 136(19), 6978-6986.
- ❖ Restuccia, P., & Righi, M. C. (2016). Tribocomplexity of graphene on iron and its possible role in lubrication of steel. *Carbon*, 106, 118-124.
- ❖ Samanta, B., Chakraborty, J., Choudhury, C. R., Dey, S. K., Dey, D. K., Batten, S. R., ... & Mitra, S. (2007). New Cu (II) complexes with polydentate chelating Schiff base ligands: Synthesis, structures, characterisations and biochemical activity studies. *Structural Chemistry*, 18(1), 33-41.
- ❖ Sanes, J., Carrión, F. J., & Bermúdez, M. D. (2009). ZnO–ionic liquid nanostructures. *Applied surface science*, 255(9), 4859-4862.
- ❖ Saurín, N., Minami, I., Sanes, J., & Bermúdez, M. D. (2016). Study of the effect of tribo-materials and surface finish on the lubricant performance of new halogen-free room temperature ionic liquids. *Applied Surface Science*, 366, 464-474.
- ❖ Shah, F. U., Glavatskikh, S., & Antzutkin, O. N. (2009). Synthesis, Physicochemical, and Tribological Characterization of S-Di-n-octoxyboron-O, O'-di-n-octyldithiophosphate. *ACS applied materials & interfaces*, 1(12), 2835-2842.
- ❖ Shen, T., Wang, D., Yun, J., Liu, Q., Liu, X., & Peng, Z. (2016). Tribological properties and tribocomplexity analysis of nano-cerium oxide and sulfurized isobutene in titanium complex grease. *Tribology International*, 93, 332-346.

- ❖ Shenghua, L., He, Y., & Yuansheng, J. (2004). Lubrication chemistry viewed from DFT-based concepts and electronic structural principles. *International Journal of Molecular Sciences*, 5(1), 13-34.
- ❖ Singh, R. K., Kukrety, A., Saxena, R. C., Thakre, G. D., Atray, N., & Ray, S. S. (2016). Novel triazine Schiff base-based cationic gemini surfactants: synthesis and their evaluation as antiwear, antifriction, and anticorrosive additives in polyol. *Industrial & Engineering Chemistry Research*, 55(9), 2520-2526.
- ❖ Singh, R. K., Kukrety, A., Sharma, O. P., Thakre, G. D., Atray, N., & Ray, S. S. (2015). Capacity of thiourea Schiff base esters as multifunctional additives: synthesis, characterization and performance evaluation in polyol. *RSC advances*, 5(110), 90367-90373.
- ❖ Somers, A. E., Biddulph, S. M., Howlett, P. C., Sun, J., MacFarlane, D. R., & Forsyth, M. (2012). A comparison of phosphorus and fluorine containing IL lubricants for steel on aluminium. *Physical Chemistry Chemical Physics*, 14(22), 8224-8231.
- ❖ Song, H., Huang, J., Jia, X., & Sheng, W. (2018). Facile synthesis of core-shell Ag@C nanospheres with improved tribological properties for water-based additives. *New Journal of Chemistry*, 42(11), 8773-8782.
- ❖ Spikes, H. (2008). Low-and zero-sulphated ash, phosphorus and sulphur anti-wear additives for engine oils. *Lubrication science*, 20(2), 103-136.
- ❖ St. Dennis, J. E., Jin, K., John, V. T., & Pesika, N. S. (2011). Carbon microspheres as ball bearings in aqueous-based lubrication. *ACS applied materials & interfaces*, 3(7), 2215-2218.

- ❖ Stachowiak, G. W., & Podsiadlo, P. (2004). Classification of tribological surfaces. *Tribology International*, 37(2), 211-217.
- ❖ Sun, X., & Li, Y. (2004). Colloidal carbon spheres and their core/shell structures with noble-metal nanoparticles. *Angewandte Chemie*, 116(5), 607-611.
- ❖ Svahn, F., Kassman-Rudolphi, Å., & Hogmark, S. (2006). On the effect of surface topography and humidity on lubricated running-in of a carbon based coating. *Wear*, 261(11-12), 1237-1246.
- ❖ Ta, D. T., Tieu, A. K., Zhu, H. T., & Kosasih, B. (2015). Thin film lubrication of hexadecane confined by iron and iron oxide surfaces: A crucial role of surface structure. *The Journal of Chemical Physics*, 143(16), 164702.
- ❖ Ta, T. D., Tieu, A. K., Zhu, H., & Kosasih, B. (2015). Adsorption of normal-alkanes on Fe (110), FeO (110), and Fe<sub>2</sub>O<sub>3</sub> (0001): Influence of iron oxide surfaces. *The Journal of Physical Chemistry C*, 119(23), 12999-13010.
- ❖ Ta, T. D., Tieu, A. K., Zhu, H., Kosasih, B., Zhu, Q., & Phan, H. T. (2017). The structural, tribological, and rheological dependency of thin hexadecane film confined between iron and iron oxide surfaces under sliding conditions. *Tribology International*, 113, 26-35.
- ❖ Tabor, D. (1954). Friction in Relation to Rheological Properties. *Nature*, 173(4411), 899-900.
- ❖ Tang, W., Huang, Z., & Wang, B. (2018). Synthesis of ionic liquid functionalized graphene oxides and their tribological property under water lubrication. *Fullerenes, Nanotubes and Carbon Nanostructures*, 26(3), 175-183.

- ❖ Tao, X., Jiazheng, Z., & Kang, X. (1996). The ball-bearing effect of diamond nanoparticles as an oil additive. *Journal of Physics D: Applied Physics*, 29(11), 2932.
- ❖ Välbe, R., Tarkanovskaja, M., Mäeorg, U., Reed, V., Lohmus, A., Taaber, T., ... & Lõhmus, R. (2017). Phosphonium-based ionic liquids mixed with stabilized oxide nanoparticles as highly promising lubricating oil additives. *Proceedings of the Estonian Academy of Sciences*, 66(2), 174.
- ❖ Varlot, K., Martin, J. M., Grossiord, C., Vargiu, R., Vacher, B., & Inoue, K. (1999). A dual-analysis approach in tribochemistry: application to ZDDP/calcium borate additive interactions. *Tribology Letters*, 6(3-4), 181-189.
- ❖ Veerapandian, M., Sadhasivam, S., Choi, J., & Yun, K. (2012). Glucosamine functionalized copper nanoparticles: preparation, characterization and enhancement of anti-bacterial activity by ultraviolet irradiation. *Chemical engineering journal*, 209, 558-567.
- ❖ Verma, D. K., Kumar, B., Kavita, & Rastogi, R. B. (2018). Zinc oxide-and magnesium-doped zinc oxide-decorated nanocomposites of reduced graphene oxide as friction and wear modifiers. *ACS applied materials & interfaces*, 11(2), 2418-2430.
- ❖ Viesca, J. L., Battez, A. H., González, R., Chou, R., & Cabello, J. J. (2011). Antiwear properties of carbon-coated copper nanoparticles used as an additive to a polyalphaolefin. *Tribology international*, 44(7-8), 829-833.
- ❖ Wan, Y., Yao, W., Ye, X., Cao, L., Shen, G., & Yue, Q. (1997). Tribological performance and action mechanism of certain S, N heterocyclic compounds as potential lubricating oil additives. *Wear*, 210(1-2), 83-87.

- ❖ Wang, B., Tang, W., Lu, H., & Huang, Z. (2016). Ionic liquid capped carbon dots as a high-performance friction-reducing and antiwear additive for poly (ethylene glycol). *Journal of Materials Chemistry A*, 4(19), 7257-7265.
- ❖ Wang, H., Dai, Q., Li, Q., Yang, J., Zhong, X., Huang, Y., ... & Yan, Z. (2009). Preparation of porous carbon spheres from porous starch. *Solid State Ionics*, 180(26-27), 1429-1432.
- ❖ Wang, S., Huang, X., He, Y., Huang, H., Wu, Y., Hou, L., ... & Huang, B. (2012). Synthesis, growth mechanism and thermal stability of copper nanoparticles encapsulated by multi-layer graphene. *Carbon*, 50(6), 2119-2125.
- ❖ Westerholt, A., Weschta, M., Bösmann, A., Tremmel, S., Korth, Y., Wolf, M., ... & Holweger, W. (2015). Halide-free synthesis and tribological performance of oil-miscible ammonium and phosphonium-based ionic liquids. *ACS Sustainable Chemistry & Engineering*, 3(5), 797-808.
- ❖ Wickramaratne, N. P., & Jaroniec, M. (2013). Activated carbon spheres for CO<sub>2</sub> adsorption. *ACS applied materials & interfaces*, 5(5), 1849-1855.
- ❖ Wilburn, D. R., & Bassett, W. A. (1978). Hydrostatic compression of iron and related compounds; an overview. *American Mineralogist*, 63(5-6), 591-596.
- ❖ Wu, H., Li, J., Ma, H., & Ren, T. (2009). The tribological behaviours of dithiocarbamate-triazine derivatives as additives in mineral oil. *Surface and Interface Analysis: An International Journal devoted to the development and application of techniques for the analysis of surfaces, interfaces and thin films*, 41(3), 151-156.

- ❖ Xie, H., Jiang, B., He, J., Xia, X., & Pan, F. (2016). Lubrication performance of MoS<sub>2</sub> and SiO<sub>2</sub> nanoparticles as lubricant additives in magnesium alloy-steel contacts. *Tribology International*, 93, 63-70.
- ❖ Xiong, L., He, Z., Han, S., Tang, J., Wu, Y., & Zeng, X. (2016). Tribological properties study of N-containing heterocyclic imidazoline derivatives as lubricant additives in water-glycol. *Tribology International*, 104, 98-108.
- ❖ Yadgarov, L., Petrone, V., Rosentsveig, R., Feldman, Y., Tenne, R., & Senatore, A. (2013). Tribological studies of rhenium doped fullerene-like MoS<sub>2</sub> nanoparticles in boundary, mixed and elasto-hydrodynamic lubrication conditions. *Wear*, 297(1-2), 1103-1110.
- ❖ Yang, G., Zhang, J., Zhang, S., Yu, L., Zhang, P., & Zhu, B. (2013). Preparation of triazine derivatives and evaluation of their tribological properties as lubricant additives in poly-alpha olefin. *Tribology International*, 62, 163-170.
- ❖ Ye, X., Ma, L., Yang, Z., Wang, J., Wang, H., & Yang, S. (2016). Covalent functionalization of fluorinated graphene and subsequent application as water-based lubricant additive. *ACS applied materials & interfaces*, 8(11), 7483-7488.
- ❖ Yu, B., Liu, Z., Ma, C., Sun, J., Liu, W., & Zhou, F. (2015). Ionic liquid modified multi-walled carbon nanotubes as lubricant additive. *Tribology International*, 81, 38-42.
- ❖ Zeng, X., Peng, Y., Yu, M., Lang, H., Cao, X. A., & Zou, K. (2018). Dynamic sliding enhancement on the friction and adhesion of graphene, graphene oxide, and fluorinated graphene. *ACS applied materials & interfaces*, 10(9), 8214-8224.

- ❖ Zhang, C., Zhang, S., Yu, L., Zhang, P., Zhang, Z., & Wu, Z. (2012). Tribological behavior of 1-methyl-3-hexadecylimidazolium tetrafluoroborate ionic liquid crystal as a neat lubricant and as an additive of liquid paraffin. *Tribology Letters*, 46(1), 49-54.
- ❖ Zhang, G., Chang, L., & Schlarb, A. K. (2009). The roles of nano-SiO<sub>2</sub> particles on the tribological behavior of short carbon fiber reinforced PEEK. *Composites Science and Technology*, 69(7-8), 1029-1035.
- ❖ Zhang, J., Liu, W., & Xue, Q. (1999). The effect of molecular structure of heterocyclic compounds containing N, O and S on their tribological performance. *Wear*, 231(1), 65-70.
- ❖ Zhang, L., Pu, J., Wang, L., & Xue, Q. (2015). Synergistic effect of hybrid carbon nanotube-graphene oxide as nanoadditive enhancing the frictional properties of ionic liquids in high vacuum. *ACS applied materials & interfaces*, 7(16), 8592-8600.
- ❖ Zhang, Y., Huang, B., Li, P., Wang, X., & Zhang, Y. (2013). Tribological performance of CuS-ZnO nanocomposite film: The effect of CuS doping. *Tribology International*, 58, 7-11.
- ❖ Zhou, F., Liang, Y., & Liu, W. (2009). Ionic liquid lubricants: designed chemistry for engineering applications. *Chemical Society Reviews*, 38(9), 2590-2599.
- ❖ Zhou, G., Zhu, Y., Wang, X., Xia, M., Zhang, Y., & Ding, H. (2013). Sliding tribological properties of 0.45% carbon steel lubricated with Fe<sub>3</sub>O<sub>4</sub> magnetic nano-particle additives in baseoil. *Wear*, 301(1-2), 753-757.

- ❖ Zhou, J., Wu, Z., Zhang, Z., Liu, W., & Dang, H. (2001). Study on an antiwear and extreme pressure additive of surface coated LaF<sub>3</sub> nanoparticles in liquid paraffin. *Wear*, 249(5-6), 333-337.
- ❖ Zhou, Y., & Qu, J. (2017). Ionic liquids as lubricant additives: a review. *ACS applied materials & interfaces*, 9(4), 3209-3222.
- ❖ Zhou, Y., Dyck, J., Graham, T. W., Luo, H., Leonard, D. N., & Qu, J. (2014). Ionic liquids composed of phosphonium cations and organophosphate, carboxylate, and sulfonate anions as lubricant antiwear additives. *Langmuir*, 30(44), 13301-13311.
- ❖ Zhou, Y., Pan, G., Shi, X., Zhang, S., Gong, H., & Luo, G. (2015). Effects of ultra-smooth surface atomic step morphology on chemical mechanical polishing (CMP) performances of sapphire and SiC wafers. *Tribology international*, 87, 145-150.