

REFERENCES



- Abe A, Kamergawa T, Nakajima Y. Optimum young modulus distribution in tire design. Tire Sci. Technol. 1996; 24 (3):204.
- Abaqus. Example Problem manual, Version 6.7, Volume II. 2006; Other Application and Analysis, Tire Analysis, Section: 3.1.1 to 3.1.3, Simulia, Providence Rhode Island, USA.
- Abaqus. Analysis user's manual, Version 6.7, Volume III. 2006; Materials, Simulia, Providence Rhode Island, USA.
- Ahmed MB, Darroudi M, Shameli K. Antibacterial effect of synthesized Silver-Montmorillonite Nanocomposites by UV-irradiation Method. Res. J. Biol. Sci. 2009; 4(9): 1056-1060.
- Alexandre M, Dubois P. Polymer layered silicate nanocomposites: Preparation, properties and uses of a new class of materials. Mater. Sci. Eng. 2000; 28: 1-63.
- Ansarifard A, Nijhawan R, Nanapoolsin T, Song M. Reinforcing effect of silica and silane fillers on the properties of some natural rubber vulcanizates. Rubber Chem. Technol. 2003; 76:1290.
- Arroyo M, Lopez-Manchado M, Herrero B. Organo-montmorillonite as Substitute of Carbon Black in Natural Rubber Compounds. Polymer. 2003; 44:2447-2453.
- Bandyopadhyay S, Giannelis E, Hsieh A. Thermal and Thermo-Mechanical Properties of PMMA Nanocomposites. Polym. Mater. Sci. & Eng. 2000; 82: 208-209.
- Bharadwaj R. Modeling the Barrier Properties of Polymer-Layered Silicate Nanocomposites. Macromolecules. 2001; 34: 9189-9192.
- Blume A. Analytical Properties of Silica - a Key for Understanding Silica Reinforcement. Paper No. 73 presented at a meeting of ACS, Rubber Division, Chicago, IL, 1999.
- Blow CM. Rubber Technology and Manufacture. Butterworths, London, 1971.
- Boyce M, Sheng N, Parks D. Micro/Nanoscale Modeling of Anisotropic Mechanical Properties of Polymer Nano-Clay Composites. Polymeric Materials Sci. and Eng. 2002; 86, 425-426.
- Bridgestone environmental report. Tokyo, Japan, Bridgestone 2002; 14: 12.

REFERENCES

- Brinke AT. Silica Reinforced Tyre Rubbers, mechanistic aspects of the role of coupling agents. University of Twente, Ph.D. Thesis, 2002.
- Carrado KA. Synthetic organo-and polymer-clays: preparation, characterization and materials applications. *Appl. Clay Sci.* 2000; 17: 1–23.
- Carrado K. Polymer-Clay Nanocomposites. *Advanced Polymeric Materials*. Shonaike G, and Advani S (Eds). CRC Press. Boca Raton. 2003; 349-396.
- Chen G, Chen X, Lin Z, Ye W, Yao K. Preparation and Properties of PMMA/Clay Nanocomposite, *J. Mat. Sci.* 1999; Letters, 18: 1761-1763.
- Clark SK. Mechanics of Pneumatic Tires, Office of Vehicle Systems Research, Institute for Applied Technology and National Bureau of Standards, Washington, 1971; 596–597.
- Costa FR, Goad MH, Wagenknecht U, Heinrich G. Layered double hydroxides: noble materials for the development of multi-functional nanohybrids *Polymer*. 2005; 46: 4447.
- Das A, Jurk R, Stöckelhuber KW, Engelhardt T, Fritzsche J, Klüppel M. Nanoalloy based on clays: intercalated-exfoliated layered silicate in high performance elastomer. *J. Macromol. Sci. Pure Appl. Chem.* 2008; 45:144–50.
- Dick J (Ed.), *Rubber Technology Compounding and Testing Performance*, Hanser Gardner Publications, 2001.
- Donnet JB, Bansal R, Wang MJ (Eds.). *Carbon Black Science and Technology*, Marcel Dekker, Inc. New York, 1993.
- Ebbott TG, Hohman RL, Jeusette JP, Kerchman V. Tire temperature and rolling resistance prediction with finite element analysis. *Tire Sci. Technol.* 1999; 27:2–21.
- Eitzman D, Melkote R, Cussler E. Barrier Membranes with Tipped Impermeable Flakes. *AIChE Journal*. 1996; 42:2-9.
- Frohlich J, Niedermeier W, Luginsland HD. The effect of filler–filler and filler–elastomer interaction on rubber reinforcement. *Composites: Part A*. 2005; 36 : 449–460.
- Frogley MD, Ravich D, Wagner HD. Mechanical properties of carbon nanoparticle-reinforced elastomers. *Compos. Sci. Technol.* 2003; 63:1647–54.
- Freund B, Niedermeier W. Novel Rubber nanocomposite with Adaptable Mechanical properties, *Kautsch. Gummi Kunstst.* 1998; 51: 444.

REFERENCES

- Fu X. Synthesis and characterization of polymer-layered silicate nanocomposites. Case Western Reserve University, Ph.D. Thesis, 2001.
- Fu X, Qutubuddin S. Synthesis of polystyrene-clay nanocomposites. *Mater. Lett.* 2000; 42: 12-15.
- Ganter M, Gronski W, Semke H, Zlig T, Thomann C, Muhlhaupt R. Surface-Compatibilized Layered Silicates. A Novel Class of Nanofillers for Rubbers with Improved Mechanical Properties. *Kautsch. Gummi Kunstst.* 2001; 54: 166-171.
- Ganter M, Gronski W, Reichert P, Muhlhaupt R. Rubber Nanocomposite: Morphology and Mechanical Properties of BR and SBR Vulcanizates Reinforced by Organophilic Layered Silicates. *Rubber Chem. Technol.* 2001; 74:221-235.
- Gehman SD. Material characteristics in mechanics of pneumatic tires. S.K. Clark (Ed.), *Mechanics of Pneumatic Tires*, Office of Vehicle Systems Research, Institute for Applied Technology and National Bureau of Standards, US Department of Commerce, Washington, 1971: 1-40.
- Ghosh S, Sengupta RA, and Henrich G. High performance nanocomposite based on organoclay and blends of different types of SBR with BR. *Kautsch. Gummi Kunstst.* 2011; 48-54.
- Ghosh S, Sengupta RA, and Henrich G. Investigations on Rolling Resistance of Nanocomposite based Passenger Car Radial Tyre Tread Compounds using Simulation Technique. *Tire Sci. Technol.* 2011 (DOI).
- Giannelis E. Polymer Layered Silicate Nanocomposites. *Adv. Mater.* 1996; 8: 29-35.
- Glaeser K-P (Dr.- Ing). Rolling resistance of Tyre on Road Surface-procedure to measure Tyre Rolling Resistance. Federal Highway Research Institute; Energy Efficient Tires, IEA, Paris, 15.Nov.-16.Nov. 2005.
- Grosch KA, The Rolling Resistance, Wear and Traction Properties of Tread Compounds. *Rubber Chem. Technol.* 1996: 69:495.
- Hasegawa N, Okamoto H, Usuki A. Preparation and properties of ethylene propylene rubber (EPR)-clay nanocomposites based on maleic anhydride-modified EPR and organophilic clay. *J. Appl. Polym. Sci.* 2004; 93:758-764.
- Hofmann W. *Rubber Technology Handbook*. Hanser/Gardner, Munich, 1996.

REFERENCES

- Huber G, Vilgis TA. Universal Properties of filled rubbers, Mechanism for reinforcement on different length scales. *Kautsch. Gummi Kunstst.* 1999; 52:102-107.
- Jia QX, Wu YP, Xiang P, Ye X, Wang YQ, Zhang LQ. Combined effect of nano-clay and nano-carbon black on properties of NR nanocomposites. *Polym. Compos.* 2005;13:709–19.
- Joly S, Garnaud G, Ollitrault R, Bokobza L, Mark J. Organically Modified Layered Silicates as Reinforcing Fillers for Natural Rubber. *Chem. Mater.* 2002; 14: 4202-4208.
- Kim J, Oh T, Lee D. Preparation and characteristics of nitrile rubber (NBR) nanocomposites based on organophilic layered clay. *Polym. Int.* 2003; 52: 1058.
- Kim W, Kim SK, Kang JH, Cheo Y, Chang YW. Structure and properties of the organoclay filled NR/BR nanocomposites. *Macromol. Res.* 2006;14:187–193.
- Kojima Y, Fukumori K, Usuki A, Okada A, Kurauchi T. Gas Permeabilities in Rubber-Clay Hybrid. *J. Mater. Sci. Lett.* 1993;12, 889-890.
- Kobayashi Y, Fukuda M, Takagi A, Kanetsuki M, Matsuzawa F, Kabe K. Technique for Estimating Tire Rolling Resistance Using Finite Element Method. SAE, Japan, 1987;No. 35:140-146.
- Konishi Y, Cakmak M. Nanoparticle induced network self-assembly in polymer–carbon black composites. *Polymer* 2006;47: 5371–91.
- Kumar C, Karger-Kocsis J. Curing and Mechanical Behavior of Carboxylated NBR Containing Hygrothermally Decomposed Polyurethane. *Eur. Polym. J.* 2002; 38, 2231-2237.
- Lange H (Dr.). Consumer can safely save. Continental AG, 2011. www.conti-online.com
- Lan T, Pinnavaia TJ, Clay Reinforced Epoxy Nanocomposites. *Chem. Mater.* 1994; 6:2216-2219.
- Lopez-Manchado M, Arroyo M, Herrero B, Biagiotti J. Vulcanization Kinetics of Natural Rubber-Organoclay nanocomposites. *J. Appl. Polym. Sci.* 2003; 89:1-15.
- Lou AYC. Relationship of Tire Rolling Resistance to the Viscoelastic Properties of the Tread Rubber, *Tire Sci. Technol.* 1978; 6 (3) :176-188.
- Luchini JR, Peters JM, Arthur RH. Tire Rolling Computation with the Finite Element Method. *Tire Sci. Technol.* 1994; 22(4):206-222.

REFERENCES

- Magaraphan R, Thaijaroen W, Lim-Ochakun R. Structure and Properties of Natural Rubber and Modified Montmorillonite Nanocomposites. *Rubber Chem. Technol.* 2003; 76:406-418.
- Mark JE. *Science and Technology of Rubber*. Academic Press, San Diego, 1994.
- Medalia A. Morphology of aggregates: Effective volume of aggregates of carbon black from electron microscopy; Application to vehicle absorption and to die swell of filled rubber, *J. Colloid. Interface Sci.* 1971; 36:173-190.
- Meneghetti PC. *Synthesis and Properties of Rubber-Clay nanocomposites*. Ph.D thesis, Case Western Reserve University, 2005.
- Messersmith PB, Giannelis EP. Synthesis and Characterization of Layer Silicate-Epoxy Nanocomposites. *Chem. Mater.*, 1996; 6: 1719-1725.
- Mingyi L, Zang W, Shan W, Zhang YJ. Structure and properties of polybutadiene/montmorillonite nanocomposites prepared by in situ polymerization. *Appl Polym Sci* 2006; 99:3615-21.
- Mousa A, Karger-Kocsis J. Rheological and Thermodynamical Behavior of Styrene/Butadiene Rubber-Organoclay Nanocomposites. *Macromol. Mater. Eng.*, 2001; 286: 260-266.
- Nakajimi Y, Kadowaki H, Kamegawa T, Abe A, New tire design procedure based on optimization technique. 1966; SAE paper No.960997.
- Nah C, Ryu HJ, Kim WD, Chang YW. Preparation and properties of acrylonitrile butadiene copolymer hybrid nanocomposites with organoclays, *Polym. Int'l.* 2003;52:1359-1364.
- Nielsen L. Models for the Permeability of Filled Polymer Systems. *J. Macromol. Sci., Chem.* 1967; A1:929-941.
- Okamoto M, Morita S, Taguchi H, Kim, YH, Kotaka T, Tateyama H. Synthesis and Structure of Smectic Clay/Poly(Methyl Methacrylate) and Clay/Polystyrene Nanocomposite via in situ Intercalative Polymerization. *Polymer.* 2000; 41:3887-3890.
- Payne AR, Kraus G (Ed). *Reinforcement of Elastomers*. Interscience Publishers, New York, 1965.
- Payne AR, Whittaker R. Low strain dynamic properties of filled rubbers. *Rubber Chem. Technol.* 1971; 44: 440-478.

REFERENCES

- Payne AR, Whittaker R. Low strain dynamic properties of filled rubbers. *Rubber Chem. Technol.* 1971; 44: 440-478.
- Park HC, Youn SK, Song TS, Kim NJ. Analysis of Temperature Distribution in a Rolling Tire Due to Strain Energy Dissipation. *Tire Sci. Technol.* 1997; 25(3) :214-228.
- Pillai PS, Fielding-Russell GS. Tire rolling resistance from whole tire hysteresis ratio”, *Rubber Chem. Technol.* 1992; 65(2) :444-452.
- Plueddemann EP. Silane coupling agents. Plenum Press, New york, 1991.
- Qutubuddin S, Fu X. Polymer-Clay Nanocomposites: Synthesis and Properties. *Nano-Surface Chemistry*, Rosoff M (Ed.), Marcel Dekker, 2001; 653-673.
- Ray S, Okamoto M. Polymer/layered silicate nanocomposites: a review from preparation to processing. *Prog. Polym. Sci.* 2003; 28:1539-1641.
- Sadhu S, Bhowmick A. Effect of Chain Length of Amine and Nature and Loading of Clay on Styrene-Butadiene Rubber-Clay Nanocomposites. *Rubber Chemistry and Technology.* 2003; 76: 860-875.
- Schon F, Thomann R, Gronski W. Shear Controlled Morphology of Rubber/Organoclay Nanocomposite and Dynamic Mechanical Analysis. *Macromol. Symp.* 2002; 189:105-110.
- Schon F, Gronski W, Filler Networking of Silica and Organoclay in Rubber Composites: Reinforcement and Dynamic-Mechanical Properties. *Kautsch. Gummi Kunstst.* 2003; 56:166-171.
- Shia D, Hui C, Burnside S, Giannelis E. An Interface Model for the Prediction of Young's Modulus of Layered Silicate-Elastomer Nanocomposites. *Polymer Composites*, 1998; 19: 608-617.
- Shida Z, Koishi M, Kogure T, Kabe K. A Rolling Resistance Simulation of Tires Using Static Finite Element Analysis. *Tire Sci. Technol.* 1999; 27(2) :84-105.
- Shah RK, Kim DH, Paul DR. Morphology and properties of nanocomposites formed from ethylene/methacrylic acid copolymers and organoclays. *Polymer*, 2007; 48: 1047-1057.
- Stöckelhuber KW, Das A, Jurk R, Heinrich G. Contribution of physico-chemical properties of interfaces on dispersibility, adhesion and flocculation of filler particles in rubber. *Polymer.* 2010; 51:1954-1963.

REFERENCES

- Stretz HA, Paul DR, Li R, Keskkula H, Cassidy PE. Intercalation and exfoliation relationships in melt-processed poly (styrene-co acrylonitrile)/montmorillonite nanocomposites. *Polymer*, 2005; 46: 2621-2637.
- Theng BKG. Formation and properties of clay-polymer complexes. Elsevier, New York, 1979.
- Theng BKG. The Chemistry of Clays-Organic Reactions. Wiley, New York, 1974.
- Tire Analysis.195/65R15-Ecofriendly, Energy Saving passenger tire-European Tire Analysis Report.2009-1; Smithers Scientific Services, Inc. Akron, Ohio, USA.
- Tire Analysis. 175/65R14 82T-PCR for emerging growth market report 2004-1. Smithers Scientific Services, Inc. Akron, Ohio, USA.
- Tire Analysis. 295/80R22.5-TBR for emerging growth market report.2008-1; Smithers Scientific Services, Inc. Akron, Ohio, USA.
- Tire Analysis, 10.00R20-TBR for emerging growth markets report 2001; Smithers Scientific Services, Inc. Akron, Ohio, USA.
- Tyres-online: The Benefits of Silica in Tyre Design-A Revolution in Tyre Technology. www.tires-online.co.uk/technology/silica.asp
- Usuki A, Kawasumi M, Kojima Y, Okada A, Fukushima Y, Kurachi T, Kamigaito O. Synthesis of Nylon 6-Clay Hybrid. *J. Mater. Res.* 1993; 8(5):1179-1184.
- Usuki A, Kawasumi M, Kojima Y, Okada A, Kurauchi T, Kamigaito O. Swelling behavior of montmorillonite cation exchanged for ω -amino acids by ϵ -caprolactam, *J. Mater. Res.* 1993; 8:1174-1178.
- Usuki A, Tukigase M. Preparation and properties of EPDM-clay hybrids. *Polymer*, 2002; 43:2185-2189.
- Van AG. Diffusion in Elastomers. *Rubber Chem. Technol.* 1964; 37: 1065-1152.
- Varghese S, Karger-Kocsis J. Natural rubber-based nanocomposites by latex compounding with layered silicates. *Polymer*, 2003; 44: 4921-4927.
- Varghese S, Karger-Kocsis J. Melt-Compounded Natural Rubber Nanocomposites with Pristine and Organophilic Layered Silicates of Natural and Synthetic Origin. *J. Appl. Polym. Sci.* 2004; 91: 813-819.

REFERENCES

- Vaia RA, Ishii H, Giannelis EP. Synthesis and Properties of Two Dimensional Nanostructures by Direct Intercalation of Polymer Melts in Layered Silicates. *Chem. Mater.*, 1993; 5:1694-1696.
- Vaia R, Sauer B, Tse OK, Giannelis E. Relaxation of Confined Chains in Polymer Nanocomposites: Glass Transition Properties of Poly(ethylene oxide) Intercalated in Montmorillonite. *J. Polym. Sci. Phys. Ed.* 1997; 35:59-67.
- Wang M-J. Effect of Polymer-Filler and Filler-Filler Interactions on Dynamic Properties of Filled Vulcanizates. *Rubber Chem. Technol.* 1998; 71:520-588.
- Wang MJ. The Role of Filler Networking in Dynamic Properties of Filler Rubber. *Rubber Chem. Technol.* 1999; 72:430-448.
- Wang Y, Zhang, Tang C, Yu D. Preparation and Characterization of Rubber-Clay Nanocomposites. *J. Appl. Polym. Sci.* 2000; 78: 1879-1883.
- Wang SH, Peng Z, Zhang L, Zhang YX. Structure and properties of BR/organomontmorillonite nano composites, Symposium of International Rubber Conference 2004, Beijing, China, Volume B: 257-263.
- Wang YQ, Zhang HF, Wu YP, Wang J, Zhang LQ. Structure and properties of strain crystallized rubber-clay nanocomposites by co-coagulating the rubber latex and clay aqueous suspension, Symposium of International Rubber Conference, Beijing, China. 2004; Volume B: 420-425.
- Warholc TC. Tire Rolling Loss Prediction from the Finite Element Analysis of a Statically Loaded Tire. M.S.E. Thesis, 1987: University of Akron.
- Willett PR, Hysteresis loss in rolling tire. *Rubber Chem. Technol.* 1973; 45:425.
- Willett PR. Variation of tire hysteretic loss due to tire design: *Rubber Chem. Technol.* 1974; 47:118.
- White JL. *Rubber Processing: technology, materials, and principles.* Hanser, Munich, 1995.
- Wolff S, Wang M-J. Physical properties of vulcanizate and shift factors,” *Kautsch. Gummi Kunstst.* 1994; 47:17-25.
- Wu Y, Jia Q, Yu D, Zhang L. Structure and Properties of Nitrile Rubber (NBR)-clay nanocomposites by co-coagulating NBR latex and clay aqueous suspension. *J. Appl. Polym. Sci.* 2003; 89:3855-3858.

REFERENCES

- Xu, S. and Boyd S. Cationic Surfactant Adsorption by Swelling and Non swelling Layer Silicates. *Langmuir*. 1995;11:2508-2514.
- Yano K, Usuki A, Okada A. Synthesis and Properties of Polyimide-clay Hybrid Films. *J. Polym. Sci. A: Polym. Chem*. 1997; 35:2289-2294.
- Zanzig D J, Sandstrom PH, Crawford MJ, Verthe JJA, Losey CA. Silica Reinforced Tyre Rubbers. The Goodyear Tire & Rubber Company.1994.
- Zhang L, Wang Y, Wang Y, Sui Y, Yu D. Morphology and Mechanical Properties of Clay/Styrene Butadiene Rubber Nanocomposites, *J. Appl. Polym. Sci*. 2000; 78:1873-1878.
- Zheng H, Zhang Y, Peng Z, Zhang Y, Influence of the clay modification and compatibilizer on the structure and mechanical properties of ethylene-propylene-diene rubber/montmorillonite composites. *J. Appl. Polym. Sci*. 2004; 92:638–646.
- Zidelkheir B, Abdelgoad M, Effect of surfactant agent upon the structure of montmorillonite X-ray diffraction and thermal analysis. *J. Therm. Anal. Calorimetry*, 2008; 94: 181-187.