

ICBA Associated Peer-Reviewed Publications on Carbon Black

Physical and chemical properties

Bott, J. and Franz, R. (2019) 'Investigations into the Potential Abrasive Release of Nanomaterials due to Material Stress Conditions-Part A: Carbon Black Nano-Particulates in Plastic and Rubber Composites', *Applied Sciences*, 9(2).

Bott, J., Störmer, A. and Franz, R. (2014) 'Migration of nanoparticles from plastic packaging materials containing carbon black into foodstuffs', *Food Additives & Contaminants: Part A*, 31(10), pp. 1769-1782.

Hamm, S., Frey, T., Weinand, R., Moninot, G. and Petiniot, N. (2009) 'Investigations on the extraction and migration behavior of polycyclic aromatic hydrocarbons (PAHs) from cured rubber formulations containing carbon black as reinforcing agent', *Rubber Chemistry & Technology*, 82(2).

Levy, L., Chaudhuri, I. S., Krueger, N. and McCunney, R. J. (2012) 'Does carbon black disaggregate in lung fluid? A critical assessment', *Chem Res Toxicol*, 25(10), pp. 2001-6.

Chemical identity

Chaudhuri, I., Ngiewih, Y., McCunney, R. J. and Levy, L. (2021) 'Carbon black is not black carbon', *Toxicological & Environmental Chemistry*, 103(2), pp. 236-237.

Long, C. M., Nascarella, M. A. and Valberg, P. A. (2013) 'Carbon black vs. black carbon and other airborne materials containing elemental carbon: physical and chemical distinctions', *Environ Pollut*, 181, pp. 271-86.

Watson, A. Y. and Valberg, P. A. (2001) 'Carbon black and soot: two different substances', *AIHAJ*, 62(2), pp. 218-28.

Toxicology

Borm, P. J., Cakmak, G., Jermann, E., Weishaupt, C., Kempers, P., van Schooten, F. J., Oberdorster, G. and Schins, R. P. (2005) 'Formation of PAH-DNA adducts after in vivo and vitro exposure of rats and lung cells to different commercial carbon blacks', *Toxicol Appl Pharmacol*, 205(2), pp. 157-67.

Carter, J. M., Corson, N., Driscoll, K. E., Elder, A., Finkelstein, J. N., Harkema, J. N., Gelein, R., Wade-Mercer, P., Nguyen, K. and Oberdorster, G. (2006) 'A comparative dose-related response of several key pro- and antiinflammatory mediators in the lungs of rats, mice, and hamsters after subchronic inhalation of carbon black', *J Occup Environ Med*, 48(12), pp. 1265-78.

Chaudhuri, I., Fruijtier-Polloth, C., Ngiewih, Y. and Levy, L. (2018) 'Evaluating the evidence on genotoxicity and reproductive toxicity of carbon black: a critical review', *Crit Rev Toxicol*, 48(2), pp. 143-169.

Chaudhuri, I., Ngiewih, Y., Levy, L. and McCunney, R. J. (2023) 'Comment on Balwierz et al. Potential Carcinogens in Makeup Cosmetics. Int. J. Environ. Res. Public Health 2023, 20, 4780', *International Journal of Environmental Research and Public Health*, 20(19). DOI: 10.3390/ijerph20196901.

Creutzenberg, O., Hammann, V., Wolf, S., Daul, J., Ngiewih, Y., Chaudhuri, I. and Levy, L. (2022) 'Toxicokinetic study following intratracheal instillation or oral gavage of two [(7)Be]-tagged carbon black samples', *Part Fibre Toxicol*, 19(1), pp. 63.

Creutzenberg, O., Pohlmann, G., Schaudien, D. and Kock, H. (2022b) 'Toxicokinetics of Nanoparticles Deposited in Lungs Using Occupational Exposure Scenarios', *Front Public Health*, 10, pp. 909247.

Driscoll, K. E. (1996) 'Role of inflammation in the development of rat lung tumors in response to chronic particle exposure', *Inhal Toxicol*, 8, pp. 139-153.

Driscoll, K. E., Borm, P. A., Chaudhuri, I., Levy, L., Yong, M., Warheit, D., McCunney, R. and Oberdörster, G. (2020) 'Comment on Saber et al. (2019), "Commentary: the chronic inhalation study in rats for assessing lung cancer risk may be better than its reputation", Part Fibre Toxicol: Vol. 1, pp. 33.

Driscoll, K. E., Carter, J. M., Howard, B. W., Hassenbein, D. G., Pepelko, W., Baggs, R. B. and Oberdörster, G. (1996) 'Pulmonary inflammatory, chemokine, and mutagenic responses in rats after subchronic inhalation of carbon black', *Toxicol Appl Pharmacol*, 136(2), pp. 372-80.

Driscoll, K. E., Deyo, L. C., Carter, J. M., Howard, B. W., Hassenbein, D. G. and Bertram, T. A. (1997) 'Effects of particle exposure and particle-elicited inflammatory cells on mutation in rat alveolar epithelial cells', *Carcinogenesis*, 18(2), pp. 423-430.

Elder, A., Gelein, R., Finkelstein, J. N., Driscoll, K. E., Harkema, J. and Oberdörster, G. (2005) 'Effects of Subchronically Inhaled Carbon Black in Three Species. I. Retention Kinetics, Lung Inflammation, and Histopathology', *Toxicological Sciences*, 88(2), pp. 614-629.

Greim, H., Borm, P. J., Schins, R., Donaldson, K., Driscoll, K. E., Hartwig, A., Kuempel, E., Oberdörster, G. and Speit, G. (2001) 'Toxicity of Fibres and Particles. Report of the Workshop held in Munich, Germany, 26 to 27 October 2000', *Inhalation Toxicology*, 13(9), pp. 737-754.

Levy, L. S., Chaudhuri, I., Morfeld, P. and McCunney, R. (2011) 'Comments on induction of inflammasome-dependent pyroptosis by carbon black nanoparticles', *J Biol Chem*, 286(38), pp. le17; author reply le18.

McCunney, R. J., Levy, L., Chaudhuri, I., Ngiewih, Y., Yong, M. and Wampler, W. (2023) 'Carbon Black', *Patty's Toxicology*: Wiley online library, pp. 1-25. <https://doi.org/10.1002/0471125474.tox111.pub3>

Santhanam, P., Wagner, J. G., Elder, A., Gelein, R., Carter, J., Driscoll, K., Oberdörster, G. and Harkema, J. (2008) 'Effects of subchronic inhalation exposure to carbon black nanoparticles in the nasal airways of laboratory rats', *International Journal of Nanotechnology*, 5(1), pp. 30-54.

Studies evaluating relevance of animal toxicity to human health risk assessment

Bevan, R. J., Kreiling, R., Levy, L. S. and Warheit, D. B. (2018) 'Toxicity testing of poorly soluble particles, lung overload and lung cancer', *Regul Toxicol Pharmacol*, 100, pp. 80-91.

Borm, P. J. A. and Driscoll, K. E. (2019) 'The hazards and risks of inhaled poorly soluble particles - where do we stand after 30 years of research?', *Part Fibre Toxicol*, 16(1), pp. 11.

Driscoll, K. E. (2022) 'Review of Lung Particle Overload, Rat Lung Cancer, and the Conclusions of the Edinburgh Expert Panel-It's Time to Revisit Cancer Hazard Classifications for Titanium Dioxide and Carbon Black', *Front Public Health*, 10, pp. 907318.

Driscoll, K. E. and Borm, P. J. A. (2020) 'Expert workshop on the hazards and risks of poorly soluble low toxicity particles', *Inhal Toxicol*, 32(2), pp. 53-62.

Levy, L. S. (1995a) 'Inhalation Toxicology and Human Risk Assessment of Carbon Black', Indoor Environment, 4, pp. 263-280.

Levy, L. S. (1995b) 'Review : The 'Particle Overload' Phenomenon and Human Risk Assessment', Indoor Environment, 4(5), pp. 254-262.

Mauderly, J. L. and McCunney, R. (1996) 'Particle Overload in the Rat. Implications for Human Risk Assessment. Proceedings of a Conference Held at the Massachusetts Institute of Technology on March 29 and 30, 1995. Taylor & Francis'.

McCunney, R. J. (1996) Particle Overload In The Rat Lung And Lung Cancer: Implications For Human Risk Assessment. Inhalation toxicology: Taylor & Francis.

McCunney, R. J. and Yong, M. (2022) 'Coal Miners and Lung Cancer: Can Mortality Studies Offer a Perspective on Rat Inhalation Studies of Poorly Soluble Low Toxicity Particles?', Front Public Health, 10, pp. 907157.

Morfeld, P., Bruch, J., Levy, L., Ngiewih, Y., Chaudhuri, I., Muranko, H. J., Myerson, R. and McCunney, R. J. (2015) 'Translational toxicology in setting occupational exposure limits for dusts and hazard classification - a critical evaluation of a recent approach to translate dust overload findings from rats to humans', Part Fibre Toxicol, 12, pp. 3.

Morfeld, P., Bruch, J., Levy, L., Ngiewih, Y., Chaudhuri, I., Muranko, H. J., Myerson, R. and McCunney, R. J. (2016) 'Response to the Reply on behalf of the 'Permanent Senate Commission for the Investigation of Health Hazards of Chemical Compounds in the Work Area' (MAK Commission) by Andrea Hartwig Karlsruhe Institute of Technology (KIT)', Part Fibre Toxicol, pp. 1.

Morfeld, P., McCunney, R. J., Levy, L. and Chaudhuri, I. S. (2012) 'Inappropriate exposure data and misleading calculations invalidate the estimates of health risk for airborne titanium dioxide and carbon black nanoparticle exposures in the workplace', Environ Sci Pollut Res Int, 19(4), pp. 1326-7; author reply 1328-9.

Warheit, D. B., Kreiling, R. and Levy, L. S. (2016) 'Relevance of the rat lung tumor response to particle overload for human risk assessment-Update and interpretation of new data since ILSI 2000', Toxicology, 374, pp. 42-59.

Exposure Studies

Gardiner, K., Calvert, I. A., van Tongeren, M. J. and Harrington, J. M. (1996) 'Occupational exposure to carbon black in its manufacture: data from 1987 to 1992', Ann Occup Hyg, 40(1), pp. 65-77.

Gardiner, K., Hale, K. A., Calvert, I. A., Rice, C. and Harrington, J. M. (1992a) 'The suitability of the urinary metabolite 1-hydroxypyrene as an index of poly nuclear aromatic hydrocarbon bioavailability from workers exposed to carbon black', The Annals of Occupational Hygiene, 36(6), pp. 681-688.

Gardiner, K., Trethowan, N. W., Harrington, J. M., Rossiter, C. E. and Calvert, I. A. (1993) 'Respiratory health effects of carbon black: a survey of European carbon black workers', British Journal of Industrial Medicine, 50(12), pp. 1082-1096.

Gardiner, K., Trethowan, W. N., Harrington, J. M., Calvert, I. A. and Glass, D. C. (1992b) 'Occupational exposure to carbon black in its manufacture', The Annals of Occupational Hygiene, 36(5), pp. 477-496.

Gardiner, K., van Tongeren, M. and Harrington, M. (2001) 'Respiratory health effects from exposure to carbon black: results of the phase 2 and 3 cross sectional studies in the European carbon black manufacturing industry', Occup Environ Med, 58(8), pp. 496-503.

Harber, P., Muranko, H., Shvartsblat, S., Solis, S., Torossian, A. and Oren, T. (2003) 'A triangulation approach to historical exposure assessment for the carbon black industry', *J Occup Environ Med*, 45(2), pp. 131-43.

Kerr, S. M., Muranko, H. J. and Vincent, J. H. (2002) 'Personal Sampling for Inhalable Aerosol Exposures of Carbon Black Manufacturing Industry Workers', *Applied Occupational and Environmental Hygiene*, 17(10), pp. 681-692.

Kuhlbusch, T. A. J. and Fissan, H. (2006) 'Particle characteristics in the reactor and pelletizing area of carbon black production', *J Occup and Environ Hyg*, 3.

Kuhlbusch, T. A. J., Neumann, S. and Fissan, H. (2004) 'Number size distribution, mass concentration and particle composition of PM1, PM2.5, PM10 in bag filling areas of carbon black production', *J Occup and Environ Hyg*, 1. (10):660-71.

Morfeld, P., McCunney, R. J., Levy, L. and Chaudhuri, I. S. (2012) 'Inappropriate exposure data and misleading calculations invalidate the estimates of health risk for airborne titanium dioxide and carbon black nanoparticle exposures in the workplace', *Environ Sci Pollut Res Int*, 19(4), pp. 1326-7; author reply 1328-9.

Muranko, H. J., Hethmon, T. A. and Smith, R. G. (2001) "Total" and Respirable Dust Exposures in the U.S. Carbon Black Manufacturing Industry', AIHAJ - American Industrial Hygiene Association, 62(1), pp. 57-64.

Smith, R. G. and Musch, D. C. (1982) 'Occupational exposure to carbon black: a particulate sampling study', *Am Ind Hyg Assoc J*, 43(12), pp. 925-30.

van Tongeren, M. J. and Gardiner, K. (2001) 'Determinants of inhalable dust exposure in the European carbon black manufacturing industry', *Appl Occup Environ Hyg*, 16(2), pp. 237-45.

van Tongeren, M. J., Gardiner, K., Rossiter, C. E., Beach, J., Harber, P. and Harrington, M. J. (2002) 'Longitudinal analyses of chest radiographs from the European Carbon Black Respiratory Morbidity Study', *Eur Respir J*, 20(2), pp. 417-25.

van Tongeren, M. J. A., Kromhout, H. and Gardiner, K. (2000) 'Trends in levels of inhalable dust exposure, exceedance and overexposure in the European carbon black manufacturing industry', *The Annals of Occupational Hygiene*, 44(4), pp. 271-280.

Epidemiology

Buchte, S. F., Morfeld, P., Wellmann, J., Bolm-Audorff, U., McCunney, R. J., Piekarski, C. and International Carbon Black, A. (2006) 'Lung cancer mortality and carbon black exposure: a nested case-control study at a German carbon black production plant', *J Occup Environ Med*, 48(12), pp. 1242-52.

Dell, L. D., Gallagher, A. E., Crawford, L., Jones, R. M. and Mundt, K. A. (2015) 'Cohort Study of Carbon Black Exposure and Risk of Malignant and Nonmalignant Respiratory Disease Mortality in the US Carbon Black Industry', *J Occup Environ Med*, 57(9), pp. 984-997.

Dell, L. D., Mundt, K. A., Luippold, R. S., Nunes, A. P., Cohen, L., Burch, M. T., Heidenreich, M. J. and Bachand, A. M. (2006) 'A cohort mortality study of employees in the U.S. carbon black industry', *J Occup Environ Med*, 48(12), pp. 1219-29.

Gardiner, K. (1995) 'The methodological problems of multinational epidemiological studies with particular reference to carbon black studies', *Occup Med (Lond)*, 45(5), pp. 247-55.

- Gardiner, K., Trethewan, N. W., Harrington, J. M., Rossiter, C. E. and Calvert, I. A. (1993) 'Respiratory health effects of carbon black: a survey of European carbon black workers', *British Journal of Industrial Medicine*, 50(12), pp. 1082-1096.
- Gardiner, K., Trethewan, W. N., Harrington, J. M., Calvert, I. A. and Glass, D. C. (1992) 'Occupational exposure to carbon monoxide and sulphur dioxide during the manufacture of carbon black', *Ann Occup Hyg*, 36(4), pp. 363-72.
- Gardiner, K., van Tongeren, M. and Harrington, M. (2001) 'Respiratory health effects from exposure to carbon black: results of the phase 2 and 3 cross sectional studies in the European carbon black manufacturing industry', *J Occup Environ Med*, 58(8), pp. 496-503.
- Harber, P., Muranko, H., Shvartsblat, S., Solis, S., Torossian, A. and Oren, T. (2003a) 'A triangulation approach to historical exposure assessment for the carbon black industry', *J Occup Environ Med*, 45(2), pp. 131-43.
- Harber, P., Muranko, H., Solis, S., Torossian, A. and Merz, B. (2003b) 'Effect of carbon black exposure on respiratory function and symptoms', *J Occup Environ Med*, 45(2), pp. 144-55.
- Morfeld, P., Buchte, S. F., McCunney, R. J., Piekarski, C. and International Carbon Black, A. (2006a) 'Lung cancer mortality and carbon black exposure: uncertainties of SMR analyses in a cohort study at a German carbon black production plant', *J Occup Environ Med*, 48(12), pp. 1253-64.
- Morfeld, P., Buchte, S. F., Wellmann, J., McCunney, R. J. and Piekarski, C. (2006b) 'Lung cancer mortality and carbon black exposure: Cox regression analysis of a cohort from a German carbon black production plant', *J Occup Environ Med*, 48(12), pp. 1230-41.
- Morfeld, P. and McCunney, R. J. (2007) 'Carbon black and lung cancer: Testing a new exposure metric in a German cohort', *Am J Ind Med*, 50(8), pp. 565-7.
- Morfeld, P. and McCunney, R. J. (2009) 'Carbon black and lung cancer-testing a novel exposure metric by multi-model inference', *Am J Ind Med*, 52(11), pp. 890-9.
- Morfeld, P. and McCunney, R. J. (2010) 'Bayesian bias adjustments of the lung cancer SMR in a cohort of German carbon black production workers', *Journal of Occupational Medicine and Toxicology (London, England)*, 5, pp. 23-23.
- Morfeld, P., Mundt, K. A., Dell, L. D., Sorahan, T. and McCunney, R. J. (2016) 'Meta-Analysis of Cardiac Mortality in Three Cohorts of Carbon Black Production Workers', *Int J Environ Res Public Health*, 13(3).
- Sorahan, T., Hamilton, L., van Tongeren, M., Gardiner, K. and Harrington, J. M. (2001) 'A cohort mortality study of U.K. carbon black workers, 1951-1996', *Am J Ind Med*, 39(2), pp. 158-70.
- Sorahan, T. and Harrington, J. M. (2007) 'A "lugged" analysis of lung cancer risks in UK carbon black production workers, 1951-2004', *Am J Ind Med*, 50(8), pp. 555-64.
- Van Tongeren, M., Burstyn, I., Kromhout, H. and Gardiner, K. (2006) 'Are variance components of exposure heterogeneous between time periods and factories in the European carbon black industry?', *Ann Occup Hyg*, 50(1), pp. 55-64.

van Tongeren, M. J., Gardiner, K., Rossiter, C. E., Beach, J., Harber, P. and Harrington, M. J. (2002) 'Longitudinal analyses of chest radiographs from the European Carbon Black Respiratory Morbidity Study', *Eur Respir J*, 20(2), pp. 417-25.

van Tongeren, M. J., Kromhout, H., Gardiner, K., Calvert, I. A. and Harrington, J. M. (1999) 'Assessment of the sensitivity of the relation between current exposure to carbon black and lung function parameters when using different grouping schemes', *Am J Ind Med*, 36(5), pp. 548-56.

Wellmann, J., Weiland, S. K., Neiteler, G., Klein, G. and Straif, K. (2006) 'Cancer mortality in German carbon black workers 1976-98', *Occup Environ Med*, 63(8), pp. 513-21.

Yong, M., Anderle, L., Levy, L. and McCunney, R. J. (2019) 'Carbon Black and Lung Cancer Mortality-A Meta-regression Analysis Based on Three Occupational Cohort Studies', *J Occup Environ Med*, 61(11), pp. 949.