





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Nanoparticles in fossil and mineral fuel sectors and their impact on environment and human health: A review and perspective (Article)

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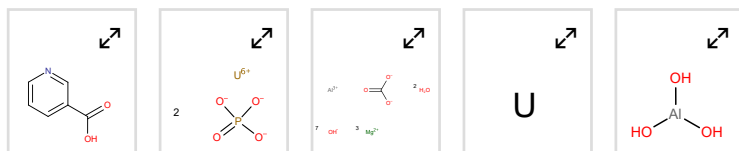
Abstract

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Nanoscience and technology have enabled better insights into the environmental and health impacts arising from the mining, production and use of fossil and mineral fuels. Here we provide an overview of the nanoscience-based applications and discoveries concerning coal and mineral fuel (i.e., uranium-containing minerals) mining, refining/production, use, and disposal of wastes. These processes result in massive nanoparticle release and secondary nanoparticle generation which have highly significant environmental implications and human health consequences on local, regional, and even global levels. Until recently, very little was known about nanoparticle fractions. Recent advancements and sophistications enable us to detect, collect and study these materials which are roughly 1 nm (0.001 μm) up to several tens of nanometers in size. These materials are known to behave differently (chemically, electrically, and mechanically), relative to their macroscopic equivalents. This is what makes nanoscience fascinating and difficult to predict, underscoring the importance of this emerging new field. For example, nanoparticles associated with coal and mineral fuel influence the release, uptake, and transportation of hazardous elements associated with mining, processing, and waste storage in the surrounding areas. This includes long distance transport down streams, rivers, and eventually to oceans such as from coal and uranium mine drainages. In terms of human health, in all phases of mining, production/refining, use, and waste disposal, the associated nanoparticles can be acquired through oral ingestion, inhalation, and dermal absorption. Inhalation has been shown to be particularly damaging, where lung, heart, kidney, and brain diseases are prevalent. Relative to all other fields of science and engineering associated with coal and mineral fuel mining, production, use, and clean-up efforts, nanoscience, although a much newer field than the rest by comparison, is still greatly under-represented and under-utilized. There is also a continuing gap between what we so far know about the behavior of nanoparticles, and what remains to be discovered. © 2021 International Association for Gondwana Research

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References (155)

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-
- 1 Abdelouas, A.
Uranium mill tailings: Geochemistry, mineralogy, and environmental impact
(2006) *Elements*, 2 (6), pp. 335-341. Cited 163 times.
doi: 10.2113/gselements.2.6.335
[View at Publisher](#)
-
- 2 Anke, M., Seeber, O., Müller, R., Schäfer, U., Zerull, J.
SUPPLEMENT 2
(2009) *Chemie der Erde*, 69 (SUPPL.), pp. 75-90. Cited 86 times.
<http://www.sciencedirect.com/science/journal/00092819>
doi: 10.1016/j.chemer.2007.12.001
[View at Publisher](#)
-
- 3 Bargar, J.R., Bernier-Latmani, R., Giammar, D.E., Tebo, B.M.
Biogenic uraninite nanoparticles and their importance for uranium remediation
([Open Access](#))
(2008) *Elements*, 4 (6), pp. 407-412. Cited 104 times.
doi: 10.2113/gselements.4.6.407
[View at Publisher](#)
-
- 4 Basak, B.B., Sarkar, B., Sanderson, P., Naidu, R.
Waste mineral powder supplies plant available potassium: Evaluation of chemical and biological interventions ([Open Access](#))
(2018) *Journal of Geochemical Exploration*, 186, pp. 114-120. Cited 11 times.
<http://www.sciencedirect.com/science/journal/03756742>
doi: 10.1016/j.gexplo.2017.11.023
[View at Publisher](#)
-
- 5 Bernhoft, R.A.
Mercury toxicity and treatment: A review of the literature ([Open Access](#))
(2012) *Journal of Environmental and Public Health*, 2012, art. no. 460508. Cited 373 times.
<http://www.hindawi.com/journals/jep/h/>
doi: 10.1155/2012/460508
[View at Publisher](#)
-
- 6 Bernier-Latmani, R., Veeramani, H., Vecchia, E.D., Junier, P., Lezama-Pacheco, J.S., Suvorova, E.I., Sharp, J.O., (...), Bargar, J.R.
Non-uraninite products of microbial U(VI) reduction ([Open Access](#))
(2010) *Environmental Science and Technology*, 44 (24), pp. 9456-9462. Cited 158 times.
doi: 10.1021/es101675a
[View at Publisher](#)
-

- 7 Bloom, M.S., Buck Louis, G.M., Sundaram, R., Maisog, J.M., Steuerwald, A.J., Parsons, P.J.
Birth outcomes and background exposures to select elements, the Longitudinal Investigation of Fertility and the Environment (LIFE) ([Open Access](#))
- (2015) *Environmental Research*, 138, pp. 118-129. Cited 29 times.
<http://www.elsevier.com/locate/jinca/publications/store/6/2/2/8/2/1/index.htm>
doi: 10.1016/j.envres.2015.01.008
- [View at Publisher](#)
-
- 8 Briner, W., Murray, J.
Effects of short-term and long-term depleted uranium exposure on open-field behavior and brain lipid oxidation in rats
- (2005) *Neurotoxicology and Teratology*, 27 (1), pp. 135-144. Cited 73 times.
doi: 10.1016/j.ntt.2004.09.001
- [View at Publisher](#)
-
- 9 Brugge, D., De Lemos, J.L., Oldmixon, B.
Exposure pathways and health effects associated with chemical and radiological toxicity of natural uranium: A review
- (2005) *Reviews on Environmental Health*, 20 (3), pp. 177-193. Cited 136 times.
<http://www.degruyter.com/view/j/reveh>
doi: 10.1515/REVEH.2005.20.3.177
- [View at Publisher](#)
-
- 10 Calderón-Garcidueñas, L., González-Maciel, A., Reynoso-Robles, R., Hammond, J., Kulesza, R., Lachmann, I., Torres-Jardón, R., (...), Maher, B.A.
Quadruple abnormal protein aggregates in brainstem pathology and exogenous metal-rich magnetic nanoparticles (and engineered Ti-rich nanorods). The substantia nigrae is a very early target in young urbanites and the gastrointestinal tract a key brainstem portal
- (2020) *Environmental Research*, 191, art. no. 110139. Cited 4 times.
<http://www.elsevier.com/locate/jinca/publications/store/6/2/2/8/2/1/index.htm>
doi: 10.1016/j.envres.2020.110139
- [View at Publisher](#)
-
- 11 Caraballo, M.A., Michel, F.M., Hochella, M.F.
The rapid expansion of environmental mineralogy in unconventional ways: Beyond the accepted definition of a mineral, the latest technology, and using nature as our guide
- (2015) *American Mineralogist*, 100 (1), pp. 14-25. Cited 24 times.
<http://www.degruyter.com/view/j/am>
doi: 10.2138/am-2015-4749
- [View at Publisher](#)
-
- 12 Cariccio, V.L., Samà, A., Bramanti, P., Mazzon, E.
Mercury Involvement in Neuronal Damage and in Neurodegenerative Diseases
- (2019) *Biological Trace Element Research*, 187 (2), pp. 341-356. Cited 33 times.
<http://www.springer.com/humana+press/journal/12011>
doi: 10.1007/s12011-018-1380-4
- [View at Publisher](#)
-
- 13 Civeira, M.S., Ramos, C.G., Oliveira, M.L.S., Kautzmann, R.M., Taffarel, S.R., Teixeira, E.C., Silva, L.F.O.
Nano-mineralogy of suspended sediment during the beginning of coal rejects spill
- (2016) *Chemosphere*, 145, pp. 142-147. Cited 59 times.
www.elsevier.com/locate/chemosphere
doi: 10.1016/j.chemosphere.2015.11.059
- [View at Publisher](#)

- 14 Cleveland, D., Hinck, J.E., Lankton, J.S.
Elemental and radionuclide exposures and uptakes by small rodents, invertebrates, and vegetation at active and post-production uranium mines in the Grand Canyon watershed

(2021) *Chemosphere*, 263, art. no. 127908. Cited 2 times.
www.elsevier.com/locate/chemosphere
doi: 10.1016/j.chemosphere.2020.127908

View at Publisher
-
- 15 Cortes-Ramirez, J., Naish, S., Sly, P.D., Jagals, P.
Mortality and morbidity in populations in the vicinity of coal mining: A systematic review (Open Access)

(2018) *BMC Public Health*, 18 (1), art. no. 721. Cited 14 times.
<http://www.biomedcentral.com/bmcpublichealth>
doi: 10.1186/s12889-018-5505-7

View at Publisher
-
- 16 Craft, E.S., Abu-Qare, A.W., Flaherty, M.M., Garofolo, M.C., Rincavage, H.L., Abou-Donia, M.B.
Depleted and natural uranium: Chemistry and toxicological effects (Open Access)

(2004) *Journal of Toxicology and Environmental Health - Part B: Critical Reviews*, 7 (4), pp. 297-317. Cited 288 times.
doi: 10.1080/10937400490452714

View at Publisher
-
- 17 Cutruneo, C.M.N.L., Oliveira, M.L.S., Ward, C.R., Hower, J.C., De Brum, I.A.S., Sampaio, C.H., Kautzmann, R.M., (...), Silva, L.F.O.
A mineralogical and geochemical study of three Brazilian coal cleaning rejects: Demonstration of electron beam applications

(2014) *International Journal of Coal Geology*, 130, pp. 33-52. Cited 85 times.
<http://www.sciencedirect.com/science/journal/01665162>
doi: 10.1016/j.coal.2014.05.009

View at Publisher
-
- 18 Dai, S., Wang, P., Ward, C.R., Tang, Y., Song, X., Jiang, J., Hower, J.C., (...), Liu, J.
Elemental and mineralogical anomalies in the coal-hosted Ge ore deposit of Lincang, Yunnan, southwestern China: Key role of N₂-CO₂-mixed hydrothermal solutions

(2015) *International Journal of Coal Geology*, Part A 152, pp. 19-46. Cited 108 times.
<http://www.sciencedirect.com/science/journal/01665162>
doi: 10.1016/j.coal.2014.11.006

View at Publisher
-
- 19 Dashner-Titus, E.J., Hoover, J., Li, L., Lee, J.-H., Du, R., Liu, K.J., Traber, M.G., (...), Hudson, L.G.
Metal exposure and oxidative stress markers in pregnant Navajo Birth Cohort Study participants (Open Access)

(2018) *Free Radical Biology and Medicine*, 124, pp. 484-492. Cited 12 times.
www.elsevier.com/locate/freeradbiomed
doi: 10.1016/j.freeradbiomed.2018.04.579

View at Publisher
-
- 20 Dashner-Titus, E.J., Schilz, J.R., Simmons, K.A., Duncan, T.R., Alvarez, S.C., Hudson, L.G.
Differential response of human T-lymphocytes to arsenic and uranium

(2020) *Toxicology Letters*, 333, pp. 269-278.
www.elsevier.com/locate/toxlet
doi: 10.1016/j.toxlet.2020.08.013

View at Publisher

- 28 Espitia-Pérez, L., da Silva, J., Espitia-Pérez, P., Brango, H., Salcedo-Arteaga, S., Hoyos-Giraldo, L.S., de Souza, C.T., (...), Henriques, J.A.P.
Cytogenetic instability in populations with residential proximity to open-pit coal mine in Northern Colombia in relation to PM₁₀ and PM_{2.5} levels
(2018) *Ecotoxicology and Environmental Safety*, 148, pp. 453-466. Cited 15 times.
<http://www.elsevier.com/inca/publications/store/6/2/2/8/1/9/index.htm>
doi: 10.1016/j.ecoenv.2017.10.044
View at Publisher
-
- 29 Essilfie-Dughan, J., Hendry, M.J., Warner, J., Kotzer, T.
Microscale mineralogical characterization of As, Fe, and Ni in uranium mine tailings
(2012) *Geochimica et Cosmochimica Acta*, 96, pp. 336-352. Cited 28 times.
doi: 10.1016/j.gca.2012.08.005
View at Publisher
-
- 30 Finch, R., Murakami, T.
Systematics and paragenesis of uranium minerals
(1999) *Reviews in Mineralogy and Geochemistry*, 38, pp. 91-179. Cited 415 times.
-
- 31 Finkelman, R.B., Dai, S., French, D.
The importance of minerals in coal as the hosts of chemical elements: A review
(Open Access)
(2019) *International Journal of Coal Geology*, 212, art. no. 103251. Cited 59 times.
<http://www.sciencedirect.com/science/journal/01665162>
doi: 10.1016/j.coal.2019.103251
View at Publisher
-
- 32 Fraund, M., Pham, D.Q., Bonanno, D., Harder, T.H., Wang, B., Brito, J., de Sá, S.S., (...), Moffet, R.C.
Elemental mixing state of aerosol particles collected in central amazonia during GoAmazon2014/15 (Open Access)
(2017) *Atmosphere*, 8 (9), art. no. 173. Cited 17 times.
<http://www.mdpi.com/2073-4433/8/9/173/pdf>
doi: 10.3390/atmos8090173
View at Publisher
-
- 33 Gasparotto, J., Martinello, K.B.
Coal as an energy source and its impacts on human health
(2021) *Energy Geosci.*
-
- 34 Gasparotto, J., Chaves, P.R., da Boit Martinello, K., da Rosa-Siva, H.T., Bortolin, R.C., Silva, L.F.O., Rabelo, T.K., (...), Moreira, J.C.F.
Obese rats are more vulnerable to inflammation, genotoxicity and oxidative stress induced by coal dust inhalation than non-obese rats (Open Access)
(2018) *Ecotoxicology and Environmental Safety*, 165, pp. 44-51. Cited 33 times.
<http://www.elsevier.com/inca/publications/store/6/2/2/8/1/9/index.htm>
doi: 10.1016/j.ecoenv.2018.08.097
View at Publisher
-

- 35 Gasparotto, J., Chaves, P.R., da Boit Martinello, K., Silva Oliveira, L.F., Gelain, D.P., Fonseca Moreira, J.C.
Obesity associated with coal ash inhalation triggers systemic inflammation and oxidative damage in the hippocampus of rats ([Open Access](#))
- (2019) *Food and Chemical Toxicology*, 133, art. no. 110766. Cited 6 times.
www.elsevier.com/locate/foodchemtox
doi: 10.1016/j.fct.2019.110766
- [View at Publisher](#)
-
- 36 Gomez, M.A., Hendry, M.J., Koshinsky, J., Essilfie-Dughan, J., Paikaray, S., Chen, J.
Mineralogical controls on aluminum and magnesium in uranium mill tailings: Key Lake, Saskatchewan, Canada
- (2013) *Environmental Science and Technology*, 47 (14), pp. 7883-7891. Cited 27 times.
<http://pubs.acs.org/journal/esthag>
doi: 10.1021/es400658f
- [View at Publisher](#)
-
- 37 Plata, L.G., Ramos, C.G., Silva Oliveira, M.L., Silva Oliveira, L.F.
Release kinetics of multi-nutrients from volcanic rock mining by-products: Evidences for their use as a soil remineralizer ([Open Access](#))
- (2021) *Journal of Cleaner Production*, 279, art. no. 123668. Cited 3 times.
<https://www.journals.elsevier.com/journal-of-cleaner-production>
doi: 10.1016/j.jclepro.2020.123668
- [View at Publisher](#)
-
- 38 Gorby, Y.A., Lovley, D.R.
Enzymic Uranium Precipitation
- (1992) *Environmental Science and Technology*, 26 (1), pp. 205-207. Cited 272 times.
doi: 10.1021/es00025a026
- [View at Publisher](#)
-
- 39 Gredilla, A., Fdez-Ortiz de Vallejuelo, S., Rodriguez-Iruretagoiena, A., Gomez, L., Oliveira, M.L.S., Arana, G., de Diego, A., (...), Silva, L.F.O.
Evidence of mercury sequestration by carbon nanotubes and nanominerals present in agricultural soils from a coal fired power plant exhaust ([Open Access](#))
- (2019) *Journal of Hazardous Materials*, 378, art. no. 120747. Cited 27 times.
www.elsevier.com/locate/jhazmat
doi: 10.1016/j.jhazmat.2019.120747
- [View at Publisher](#)
-
- 40 Hendryx, M., Innes-Wimsatt, K.A.
Increased risk of depression for people living in coal mining areas of central appalachia
- (2013) *Ecopsychology*, 5 (3), pp. 179-187. Cited 17 times.
doi: 10.1089/eco.2013.0029
- [View at Publisher](#)
-
- 41 Hendryx, M., Zullig, K.J.
Higher coronary heart disease and heart attack morbidity in Appalachian coal mining regions
- (2009) *Preventive Medicine*, 49 (5), pp. 355-359. Cited 58 times.
doi: 10.1016/j.ypped.2009.09.011
- [View at Publisher](#)
-

- 42 Hochella Jr., M.F., Moore, J.N., Putnis, C.V., Putnis, A., Kasama, T., Eberl, D.D.
Direct observation of heavy metal-mineral association from the Clark Fork River Superfund Complex: Implications for metal transport and bioavailability
(2005) *Geochimica et Cosmochimica Acta*, 69 (7), pp. 1651-1663. Cited 141 times.
doi: 10.1016/j.gca.2004.07.038
[View at Publisher](#)
-
- 43 Hochella Jr., M.F., Kasama, T., Putnis, A., Putnis, C.V., Moore, J.N.
Environmentally important, poorly crystalline Fe/Mn hydrous oxides: Ferrihydrite and a possibly new vernadite-like mineral from the Clark Fork River Superfund Complex
(2005) *American Mineralogist*, 90 (4), pp. 718-724. Cited 81 times.
doi: 10.2138/am.2005.1591
[View at Publisher](#)
-
- 44 Hochella Jr., M.F., Lower, S.K., Maurice, P.A., Penn, R.L., Sahai, N., Sparks, D.L., Twining, B.S.
Nanominerals, mineral nanoparticles, and earth systems
(2008) *Science*, 319 (5870), pp. 1631-1635. Cited 580 times.
doi: 10.1126/science.1141134
[View at Publisher](#)
-
- 45 Hochella, M.F., Mogk, D.W., Ranville, J., Allen, I.C., Luther, G.W., Marr, L.C., McGrail, B.P., (...), Yang, Y.
Natural, incidental, and engineered nanomaterials and their impacts on the Earth system ([Open Access](#))
(2019) *Science*, 363 (6434), art. no. 8299. Cited 111 times.
<https://science.sciencemag.org/content/363/6434/eaau8299/tab-pdf>
doi: 10.1126/science.aau8299
[View at Publisher](#)
-
- 46 Houpert, P., Frelon, S., Lestaevel, P., Bussy, C., Gourmelon, P., Paquet, F.
Parental exposure to enriched uranium induced delayed hyperactivity in rat offspring
(2007) *NeuroToxicology*, 28 (1), pp. 108-113. Cited 15 times.
doi: 10.1016/j.neuro.2006.08.003
[View at Publisher](#)
-
- 47 Hower, J.C., Andrews, W.M., Wild, G.D., Eble, C.F., Dulong, F.T., Salter, T.L.
Quality of the Fire Clay coal bed, southeastern Kentucky
(1994) *J. Coal Qual.*, 13, pp. 13-26. Cited 33 times.
-
- 48 Hower, J.C., O'Keefe, J.M.K., Henke, K.R., Wagner, N.J., Copley, G., Blake, D.R., Garrison, T., (...), Silva, L.F.O.
Gaseous emissions and sublimates from the Truman Shepherd coal fire, Floyd County, Kentucky: A re-investigation following attempted mitigation of the fire
(2013) *International Journal of Coal Geology*, 116-117, pp. 63-74. Cited 95 times.
doi: 10.1016/j.coal.2013.06.007
[View at Publisher](#)
-
- 49 Hund, L., Bedrick, E.J., Miller, C., Huerta, G., Nez, T., Ramone, S., Shuey, C., (...), Lewis, J.
A Bayesian framework for estimating disease risk due to exposure to uranium mine and mill waste on the Navajo Nation
(2015) *Journal of the Royal Statistical Society. Series A: Statistics in Society*, 178 (4), pp. 1069-1091. Cited 31 times.
[http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)1467-985X](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1467-985X)
doi: 10.1111/rssa.12099
[View at Publisher](#)

- 50 Ishtiaq, M., Jehan, N., Khan, S.A., Muhammad, S., Saddique, U., Iftikhar, B., Zahidullah
Potential harmful elements in coal dust and human health risk assessment near the mining areas in Cherat, Pakistan

(2018) *Environmental Science and Pollution Research*, 25 (15), pp. 14666-14673. Cited 32 times.
<http://www.springerlink.com/content/0944-1344>
doi: 10.1007/s11356-018-1655-5

[View at Publisher](#)

- 51 Joaquim, A.C., Lopes, M., Stangerlin, L., Castro, K., Ceretta, L.B., Longen, W.C., Ferraz, F., (...), Perry, I.D.S.
Mental health in underground coal miners

(2018) *Archives of Environmental and Occupational Health*, 73 (6), pp. 334-343. Cited 5 times.
<http://www.tandfonline.com/action/aboutThisjournal?journalCode=vaeh20>
doi: 10.1080/19338244.2017.1411329

[View at Publisher](#)

- 52 Kaksonen, A.H., Lakaniemi, A.-M., Tuovinen, O.H.
Acid and ferric sulfate bioleaching of uranium ores: A review

(2020) *Journal of Cleaner Production*, 264, art. no. 121586. Cited 5 times.
<https://www.journals.elsevier.com/journal-of-cleaner-production>
doi: 10.1016/j.jclepro.2020.121586

[View at Publisher](#)

- 53 Keith, S., Faroon, O., Roney, N., Scinicariello, F., Wilbur, S., Ingerman, L., Lladós, F., (...), Diamond, G.
Toxicological Profile for Uranium, Atlanta (GA)
(2013) . Cited 588 times.

- 54 Kelepertzis, E.
Investigating the sources and potential health risks of environmental contaminants in the soils and drinking waters from the rural clusters in Thiva area (Greece)

(2014) *Ecotoxicology and Environmental Safety*, 100 (1), pp. 258-265. Cited 66 times.
doi: 10.1016/j.ecoenv.2013.09.030

[View at Publisher](#)

- 55 Khijniak, T.V., Slobodkin, A.I., Coker, V., Renshaw, J.C., Livens, F.R., Bonch-Osmolovskaya, E.A., Birkeland, N.-K., (...), Lloyd, J.R.

Reduction of uranium(VI) phosphate during growth of the thermophilic bacterium *Thermoterrabacterium ferrireducens* ([Open Access](#))

(2005) *Applied and Environmental Microbiology*, 71 (10), pp. 6423-6426. Cited 70 times.
doi: 10.1128/AEM.71.10.6423-6426.2005

[View at Publisher](#)

- 56 Kolker, A.
Minor element distribution in iron disulfides in coal: A geochemical review

(2012) *International Journal of Coal Geology*, 94, pp. 32-43. Cited 102 times.
doi: 10.1016/j.coal.2011.10.011

[View at Publisher](#)

- 57 Korchagin, J., Caner, L., Bortoluzzi, E.C.
Variability of amethyst mining waste: A mineralogical and geochemical approach to evaluate the potential use in agriculture
(2019) *Journal of Cleaner Production*, 210, pp. 749-758. Cited 9 times.
<https://www.journals.elsevier.com/journal-of-cleaner-production>
doi: 10.1016/j.jclepro.2018.11.039
View at Publisher
-
- 58 Kronbauer, M.A., Izquierdo, M., Dai, S., Waanders, F.B., Wagner, N.J., Mastalerz, M., Hower, J.C., (...), Silva, L.F.O.
Geochemistry of ultra-fine and nano-compounds in coal gasification ashes: A synoptic view
(2013) *Science of the Total Environment*, 456-457, pp. 95-103. Cited 77 times.
doi: 10.1016/j.scitotenv.2013.02.066
View at Publisher
-
- 59 Kurttio, P., Auvinen, A., Salonen, L., Saha, H., Pekkanen, J., Mäkeläinen, I., Väisänen, S.B., (...), Komulainen, H.
Renal effects of uranium in drinking water (Open Access)
(2002) *Environmental Health Perspectives*, 110 (4), pp. 337-342. Cited 270 times.
<http://ehp.niehs.nih.gov/>
doi: 10.1289/ehp.02110337
View at Publisher
-
- 60 Kurttio, P., Komulainen, H., Leino, A., Salonen, L., Auvinen, A., Saha, H.
Bone as a possible target of chemical toxicity of natural uranium in drinking water (Open Access)
(2005) *Environmental Health Perspectives*, 113 (1), pp. 68-72. Cited 174 times.
doi: 10.1289/ehp.7475
View at Publisher
-
- 61 Landrigan, P.J.
Air pollution and health
(2016) *Lancet*, 2, pp. 1-5.
-
- 62 Laney, A.S., Weissman, D.N.
Respiratory diseases caused by coal mine dust (Open Access)
(2014) *Journal of Occupational and Environmental Medicine*, 56, pp. S18-S22. Cited 59 times.
<http://journals.lww.com/joem>
doi: 10.1097/JOM.0000000000000260
View at Publisher
-
- 63 Lecomte, A., Cathelineau, M., Delouie, E., Brouand, M., Peiffert, C., Loukola-Ruskeeniemi, K., Pohjolainen, E., (...), Lahtinen, H.
Uraniferous bitumen nodules in the Talvivaara Ni-Zn-Cu-Co deposit (Finland): Influence of metamorphism on uranium mineralization in black shales
(2014) *Mineralium Deposita*, 49 (4), pp. 513-533. Cited 15 times.
<http://link.springer.de/link/service/journals/00126/index.htm>
doi: 10.1007/s00126-013-0502-3
View at Publisher
-

- 64 León-Mejía, G., Machado, M.N., Okuro, R.T., Silva, L.F.O., Telles, C., Dias, J., Niekraszewicz, L., (...), Zin, W.A.
Intratracheal instillation of coal and coal fly ash particles in mice induces DNA damage and translocation of metals to extrapulmonary tissues ([Open Access](#))
(2018) *Science of the Total Environment*, 625, pp. 589-599. Cited 38 times.
www.elsevier.com/locate/scitotenv
doi: 10.1016/j.scitotenv.2017.12.283
[View at Publisher](#)
-
- 65 Lewis, J., Hoover, J., MacKenzie, D.
Mining and Environmental Health Disparities in Native American Communities ([Open Access](#))
(2017) *Current environmental health reports*, 4 (2), pp. 130-141. Cited 44 times.
<http://link.springer.com/journal/40572>
doi: 10.1007/s40572-017-0140-5
[View at Publisher](#)
-
- 66 Liu, B., Peng, T., Sun, H.
Leaching behavior of U, Mn, Sr, and Pb from different particle-size fractions of uranium mill tailings
(2017) *Environmental Science and Pollution Research*, 24 (18), pp. 15804-15815. Cited 11 times.
<http://www.springerlink.com/content/0944-1344>
doi: 10.1007/s11356-017-8921-9
[View at Publisher](#)
-
- 67 Liu, X., Li, Q., Zhang, Y., Yang, Y., Xu, B., Jiang, T.
Formation process of the passivating products from arsenopyrite bioleaching by acidithiobacillus ferrooxidans in 9k culture medium ([Open Access](#))
(2019) *Metals*, 9 (12), art. no. 1320. Cited 6 times.
<https://www.mdpi.com/2075-4701/9/12/1320/pdf>
doi: 10.3390/met9121320
[View at Publisher](#)
-
- 68 Lütke, S.F., Oliveira, M.L.S., Silva, L.F.O., Cadaval, T.R.S., Dotto, G.L.
Nanomaterials assemblages and hazardous elements assessment in phosphogypsum from an abandoned phosphate fertilizer industry ([Open Access](#))
(2020) *Chemosphere*, 256, art. no. 127138. Cited 4 times.
www.elsevier.com/locate/chemosphere
doi: 10.1016/j.chemosphere.2020.127138
[View at Publisher](#)
-
- 69 Ma, M., Wang, R., Xu, L., Xu, M., Liu, S.
Emerging health risks and underlying toxicological mechanisms of uranium contamination: Lessons from the past two decades ([Open Access](#))
(2020) *Environment International*, 145, art. no. 106107. Cited 3 times.
www.elsevier.com/locate/envint
doi: 10.1016/j.envint.2020.106107
[View at Publisher](#)
-
- 70 Majumder, E.L.W., Wall, J.D.
Bio-transformations of uranium: chemical or biological processes?
(2017) *Open J. Inorg. Chem.*, 7, pp. 28-60. Cited 11 times.
-

- 71 Mäkinen, J., Wendling, L., Lavonen, T., Kinnunen, P.
Sequential bioleaching of phosphorus and uranium ([Open Access](#))
(2019) *Minerals*, 9 (6), art. no. 331. Cited 5 times.
<https://www.mdpi.com/2075-163X/9/6/331/pdf>
doi: 10.3390/min9060331
[View at Publisher](#)
-
- 72 Manisalidis, I., Stavropoulou, E., Stavropoulos, A., Bezirtzoglou, E.
Environmental and Health Impacts of Air Pollution: A Review ([Open Access](#))
(2020) *Frontiers in Public Health*, 8, art. no. 14. Cited 76 times.
<http://journal.frontiersin.org/journal/public-health/section/public-health-education-and-promotion#archive>
doi: 10.3389/fpubh.2020.00014
[View at Publisher](#)
-
- 73 Martinello, K., Oliveira, M.L.S., Molossi, F.A., Ramos, C.G., Teixeira, E.C., Kautzmann, R.M., Silva, L.F.O.
Direct identification of hazardous elements in ultra-fine and nanominerals from coal fly ash produced during diesel co-firing
(2014) *Science of the Total Environment*, 470-471, pp. 444-452. Cited 87 times.
www.elsevier.com/locate/scitotenv
doi: 10.1016/j.scitotenv.2013.10.007
[View at Publisher](#)
-
- 74 McDaniel, D.K., Ringel-Scaia, V.M., Morrison, H.A., Coutermarsh-Ott, S., Council-Troche, M., Angle, J.W., Perry, J.B., (...), Allen, I.C.
Pulmonary Exposure to Magnéli Phase Titanium Suboxides Results in Significant Macrophage Abnormalities and Decreased Lung Function ([Open Access](#))
(2019) *Frontiers in Immunology*, 10, art. no. 2714.
<https://www.frontiersin.org/journals/immunology#>
doi: 10.3389/fimmu.2019.02714
[View at Publisher](#)
-
- 75 McGill, B.D., Marlatt, J.L., Matthews, R.B., Sopuck, V.J., Homeniuk, L.A., Hubregtse, J.J.
The P2 North uranium deposit, Saskatchewan, Canada
(1993) *Exploration & Mining Geology*, 2 (4), pp. 321-331. Cited 58 times.
-
- 76 Moreno, T., Trechera, P., Querol, X., Lah, R., Johnson, D., Wrana, A., Williamson, B.
Trace element fractionation between PM₁₀ and PM_{2.5} in coal mine dust: Implications for occupational respiratory health ([Open Access](#))
(2019) *International Journal of Coal Geology*, 203, pp. 52-59. Cited 22 times.
<http://www.sciencedirect.com/science/journal/01665162>
doi: 10.1016/j.coal.2019.01.006
[View at Publisher](#)
-
- 77 Mudd, G.M.
The Sustainability of Mining in Australia: Key Production Trends and Their Environmental Implications for the Future. Research Report No. RR5
(2009). Cited 149 times.
Department of Civil Engineering, Monash University and Mineral Policy Institute
-

- 78 Murakami, T., Sato, T., Ohnuki, T., Isobe, H.
Field evidence for uranium nanocrystallization and its implications for uranium transport

(2005) *Chemical Geology*, 221 (1-2), pp. 117-126. Cited 52 times.
doi: 10.1016/j.chemgeo.2005.04.004

[View at Publisher](#)

- 79 Nancuqueo, I., Johnson, D.B., Lopes, M., Oliveira, G.
Reductive dissolution of a lateritic ore containing rare earth elements (REE) using acidithiobacillus species

(2017) *Solid State Phenomena*, 262 SSP, pp. 299-302. Cited 2 times.
<http://www.ttp.net/1012-0394.html>
ISBN: 978-303571180-6
doi: 10.4028/www.scientific.net/SSP.262.299

[View at Publisher](#)

- 80 Nesterenko, A.B., Nesterenko, V.B., Yablokov, A.V.
Consequences of the chernobyl catastrophe for public health

(2009) *Annals of the New York Academy of Sciences*, 1181, p. 31. Cited 11 times.
<http://www.blackwellpublishing.com/0077-8923>
ISBN: 978-157331757-3
doi: 10.1111/j.1749-6632.2009.04822.x

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