

Curriculum Vitae of
Zaixing HUANG

Professor of Biological Engineering

School of Chemical Engineering and Technology
China University of Mining and Technology, Xuzhou, China 221116

Distinguish Professor of Jiangsu

Adjunct Professor

Department of Civil & Architectural Engineering
University of Wyoming
1000 E. University Avenue Laramie, WY, USA 82071

Phone: +1(307)760-7367

Email: zhuang@uwyo.edu

Scholar Citation Index: https://scholar.google.com/citations?user=ous_G3MAAAAJ&hl=en

EDUCATION:

- **University of Wyoming**, Laramie, WY **2013**
PhD in Civil Engineering (environmental), Phi Kappa Phi
Dissertation: An evaluation of pretreatment agents for the stimulation of secondary biogenic coalbed natural gas (CBNG)
- **Chalmers University of Technology**, Gothenburg, Sweden **2006**
MSc in Environmental Science and Engineering
Thesis: Uptake characteristics and speciation of heavy metals on the chemcatcher passive sampler
- **Harbin Institute of Technology**, Harbin, China **2004**
BSc in Biotechnology
Thesis: Identification of bacteria in produced water from Daqing Oil Field

RESEARCH AREAS

- **Biogenic natural gas**
- **CCUS**
- **Environmental remediation**
- **Geomicrobiology**
- **REEs and other strategic metals recovery**

PUBLISHED WORKS

- **Patents**
 1. He, H., Wang, H., Huang, Z., Chen, Z., Huang, X., Mo, Q., Zhao, H., Granted on 12/01/2023. Preparation method and application of fermentation substrate for hydrogen production by sulfate reducing bacteria. CN 116287014 B.

2. Fan, M., **Huang, Z.**, Granted on 11/14/2023. Method for separation of rare earth elements from coal ash using supercritical carbon dioxide. Patent number US11814299; U.S. Application No. 17/316,315.
3. **Huang, Z.**, He, H., Urynowicz, M.A., Zhong, Y., Li, X., Zhang, W. Granted on 01/03/2023. A method of using coal seams for production of low carbon renewable natural gas with carbon capture and storage. Patent number ZL2021105985086.
4. He, H., Cao, Y., **Huang, Z.**, Zhan, D., Chen, Z., Huang, G., Granted on 04/26/2022. A method of utilizing hydrogen- and acetic acid-producing bacteria to change coal permeability. Patent Number: ZL2021110187692.
5. Urynowicz, M.A., **Huang, Z.**, Granted on 07/07/2020. Enzymatic depolymerization and solubilization of chemically pretreated coal and coal-derived constituents. Patent number US10703981, U.S. Application No. 13/901,470 and International Application Number PCT/US13/42536.

➤ **Books/Chapters**

1. **Huang, Z.** 2014. Biogenic Coalbed Natural Gas. Scholars' Press, Saarbrücken, Germany (ISBN-13: 978-3639705645; ISBN-10: 3639705645)
2. **Huang, Z.**, Guan, H., Urynowicz, M.A., Anderson-Sprecher, R. 2015. Evaluation of Factors in Solubilization of a Subbituminous Coal Using Chemical Treatment Agents. Vol 2: Coal Energy in the series of Energy Science and Technology. Studium Press

➤ **Technical Reports**

1. Marr, J.M., Landkamer, L., Mandernack, K., Figueroa, L., Gallagher, L., Glossner, A., Bagley, D., Basile F., Urynowicz, M., **Huang, Z.**, Liu, Y., Mahat, R., Rodgers, W., Harris, S., 2012. Biogeochemical Factors Enhancing Microbially Generated Methane in Coal Beds. Unconventional Onshore Program RFP2007UN001.
2. Fan, M., Tian, H., Williams, E., Gaustad, G., Adiharma, H., Radosz, M., **Huang, Z.**, Luo, Y., Das, S., 2017. A Pollution Prevention and Economically Viable Technology for Separation of Rare Earth Elements from Powder River Basin Coal Ashes (DE-FE0027069).

➤ **Refereed Journal Articles**

Published and In Press

1. Rasool, T., Ansar, M., Ali, I., Ali, M.I., Jamal, A., Badshah, M., **Huang, Z.**, Urynowicz, M. 2023. Performance evaluation of gravity-driven bioreactor (GDB) for simultaneous treatment of black liquor and domestic wastewater. **Environmental Science and Pollution Research**, 1-15.
2. Rasool, T., Ali, M.I., Jamal, A., **Huang, Z.**, Urynowicz, M. 2023. Performance evaluation and microbial profiling of integrated vertical flow constructed wetland (IVFCW) for simultaneous treatment of domestic and pulp and paper industry waste water. **Saudi Journal of Biological Sciences** 30, 103850.

3. He*, H., Cao, M., Zhan, D., Xia, W., Chen, S., Tao, X., **Huang*, Z.** 2023. Preliminary study on the surface modification of lignite and bioflotation by white-rot fungi *Hypocrea lixii* AH. **Mineral**, 13, 1492.
4. Mao, W., Mei, J., He*, H., Liu, C., Tao, X., **Huang, Z.** 2023. Bioleaching mercury from coal with *Aspergillus flavus* M-3. **Microorganisms** 11, 2702.
5. Huang, H., Tong, C., Wu, Z., Ding, J., **Huang, Z.**, He, H., Zhang, J. 2023. Ion and stable isotope geochemistry of produced water in coalbed methane wells in the Tiefa Basin. **ACS omega** 8, 39896.
6. Liu, Y., Cheng, Y., Li, Y., Guo, H., **Huang, Z.**, Urynowicz, M. 2023. Enhancement of biomethane generation from coal by anaerobically co-degrading with biological and chemical products of straw treatment. **Applied Biochemistry and Microbiology** 59, 694.
7. Yan, L., Gong, K., Guo, H., Zhang, Y., **Huang, Z.**, Urynowicz, M. 2023. Biogenic methane production from lignite in cube: Comparison of the inner and outer part of coal. **Fuel** 346, 128370.
8. Li, Y.H., Liu, F.J., Guo, J.P., Yin, F., Gao, S.S., Lu, Y., Song, R., Yu, Y.M., Zheng, J.J., Zhao, Y.P., Zhang, R.G., **Huang, Z.**, Cao, J.P., Wei, X.Y., Fan, M. 2023. Green and highly selective hydrogenation of lignin-derived aromatics at low temperature over Ru-Fe bimetallic nanoparticles supported on porous nitrogen-doped carbon. **Fuel Processing Technology** 247, 107754.
9. Feng, X., Zhang, P., Zhang, Z., Guo, H., Li, Z., **Huang, Z.**, Urynowicz, M., Ali, M.I. 2023 The effect of organics transformation and migration on pore structure of bituminous coal and lignite during biomethane production. **Environmental Science and Pollution Research**, 1-17.
10. Feng, X., Zhang, Z., Guo, H., Li, Z., **Huang, Z.**, Urynowicz, M. 2023 Enhancement of biogenic methane production from coal using supercritical CO₂. **The Journal of Supercritical Fluids**, 206023.
11. Zhang, W., **Huang*, Z.**, Zhang, D., Medunić, G., Urynowicz, M., Liu, F.J., Guo, H., Haider, G., Ali, M.I., Jamal, A., He*, H. 2023 Enhancement of biomethane production by huminite-enriched lignite pretreated with hydrogen peroxide. **International Journal of Coal Geology** 274, 104284.
12. Zhu, L., Yao*, Q., **Huang, Z.**, Li, X., Ma, Z. 2023 Biogenic methane generation from lignite coal at different temperatures. **Gas Science and Engineering** 205016.
13. Zhang, W., **Huang*, Z.**, Mo, Q., Sabar, M.A., Medunić*, G., Ivošević, T., He*, H., Urynowicz, M.A., Liu, F.J., Guo, H., Haider, R. 2023 Contaminants from a Former Croatian Coal Sludge Dictate the Structure of Microbiota in the Estuarine (Raša Bay) Sediment and Soil. **Frontier in Microbiology** 14, 1126612.
14. Cao, Y., He*, H., Zhan, D., Huang, H.Z., Zhang, Y., Fu, B., Xu, Z.M., Ali, M.I., Liu, F.J., Tao, X.X., **Huang*, Z.** 2023 Changes of Permeability and Porosity of Tiefa Anthracite after Treatment with an Acetogenic Bacterium *Clostridium* sp. **Geomicrobiology Journal** 40, 277-284.

15. Zhang, J., Chen, C., Guo, H., **Huang, Z.**, Urynowicz, M. 2023 The variation of microorganisms and organics during methane production from lignite under an electric field. **Biotechnology Letters** 45, 83-94.
16. Yan, L., Gong, K., Guo, H., Zhang, Y., **Huang, Z.**, Urynowicz, M. 2023 Biogenic methane production from lignite in cube: Comparison of the inner and outer part of coal. **Fuel** 346, 128370.
17. Parveen, S., Ali, M.I., Aslam, M., Ali, I., Jamal, A., Al-Ansari, M.M., Al-Humaid, L., Urynowicz, M. and Huang, Z. 2022 Optimizing biocatalytic potential of *Dipodascus australiensis* M-2 for degrading lignin under laboratory conditions. **Microbiological Research**, 127179.
18. Khan, J., Ali, M.I., Jamal, A., **Huang, Z.**, Achakzai, J.K., Nasir, N., Muzammil, K. and Qureshi, M.Z. 2022 Optimizing the metabolic performance of mixed bacterial culture towards dibenzothiophene desulfurization under the effect of varying nutrient and environmental factors. **Polish Journal of Environmental Studies** 31, 4167-4175.
19. He*, H., Cheng, J., Song, D.X., Su, X., Wang, L.N., **Huang***, **Z.** 2022 Impacts of surfactant on bituminous coal biosolubilization by white-rot fungi *Hypocrea lixii* HN-1. **Geomicrobiology Journal** 39, 750-756.
20. Li, Z., Cheng, J., Duan, K., Cheng, Y., Guo, H., **Huang, Z.**, Urynowicz, M. and Ali, M.I. 2022 The succession of microorganisms and organics in the process of methane generation by co-degradation of anthracite and rice straw. **International Journal of Energy Research** 46, 15116-15126.
21. Gong, K., Zhang, Y., Guo, H., **Huang, Z.**, Urynowicz, M., Ali, D. and Ishtiaq, M. 2022 Enhancing biomethane production from lignite by an anaerobic polycyclic aromatic hydrocarbon degrading fungal flora enriched from produced water. **Frontiers in Microbiology** 13, 899863.
22. **Huang, Z.**, Liu, F.J., Tang, M., Gao, Y., Bagley, D.M., He, X., Goroncy, A., Fan*, M. 2022 Removal of ions from produced water using Powder River Basin coal. **International Journal of Coal Science and Technology** 9, 1-12. Journal cover article
23. Guo, J.P., Liu, F.J., Bie, L.L., Si, X.G., Li, Y.H., Song, P., Liu, N, Zhao, Y.P, **Huang, Z.**, Cao, J.P., Wei, X.Y. 2022 Selective cleavage of C–O bond in lignin and lignin model compounds over iron/nitrogen co-doped carbon supported Ni catalyst. **Fuel** 316, 123338.
24. Bibi, F., Jamal, A., **Huang***, **Z.**, Urynowicz, M., Ali*, M.I. 2022 Advancement and role of abiotic stresses in microalgae biorefinery with a focus on lipid production. **Fuel** 316, 123192.
25. Zhang, D., He*, H., Ren, Y., Rizwan, H., Urynowicz, M., Fallgren, P., Jin, S., Ali, M.I., Jamal, A., Sabar, M., Guo, H., Liu, F.J., **Huang***, **Z.** 2022 A mini review on biotransformation of coal to methane by enhancement of chemical pretreatment. **Fuel** 308, 121961.
26. Hoang, L., Ngoc, H.T., Urynowicz, M., Dong, V.G., To, K.A., **Huang, Z.**, Nguyen, L.H., Pham, T.M.P., Nguyen, D.D., Do, C.D., Le, Q.H. 2022 Insights into hydrogeochemical

characteristics of coalbed methane reservoirs situated in the Red River Basin, Vietnam. **Science of The Total Environment** 807, 151056.

27. Han, Q., Guo*, H., Zhang, J., **Zaixing, Z.**, Michael, M., Ali, M.I. 2021 Methane generation from anthracite by fungi and methanogens mixed flora enriched from produced water associated with Qinshui Basin in China. **ACS omega** 6 (47), 31935-31944.
28. Chen, Z., Huang, X.Y., He*, H., Tang, J.L., Tao, X.X., Huang, H.Z., Haider, R., Ali, M.I., Jamal, A., **Huang*, Z.** 2021 Bioleaching coal gangue with a mixed culture of *Acidithiobacillus ferrooxidans* and *Acidithiobacillus thiooxidans*. **Minerals** 11(10), 1043.
29. Fatima, N., Jamal, A., **Huang, Z.**, Liaquat, R., Ahmad, B., Haider, R., Ali, M.I., Shoukat, T., Alothman, Z.A., Ouladsmame, M., Ali, T., Ali, S., Akhtar, N., Sillanpaa, M. 2021 Extraction and chemical characterization of humic acid from nitric acid treated lignite and bituminous coal samples. **Sustainability**, 13.
30. **Huang, Z.**, Urynowicz, M., Haider*, R., Sattar, H., Saleem, M., Hoang, L., Han, N.T., To, K.A., Quoc, H.L., Ali, M.I., Guo, H., He, H., Liu, F.J. 2021 Biogenic methane generation from Vietnamese coal after pretreatment with hydrogen peroxide. **International Journal of Energy Research** 45(13), 18713-18721.
31. Rehman, R., Ali, M.I., Ali, N., Badshah, M., Iqbal, M., Jamal*, A., **Huang*, Z.** 2021 Crude oil biodegradation potential of biosurfactant-producing *Pseudomonas aeruginosa* and *Meyerozyma* sp. **Journal of Hazardous Materials** 418, 126276.
32. Lu, W., Wang, T., He, X., Sun, K., **Huang, Z.**, Tan, G., Eddings, E.G., Adidharma, H. and Fan*, M., 2021. A new method for preparing excellent electrical conductivity carbon nanofibers from coal extraction residual. **Cleaner Engineering and Technology**, p.100109.
33. Hoang, L., Phung, T.T., To, K.A., Urynowicz, M., **Huang, Z.**, Wang, Q., Haider, R., Le*, H.Q., Hong, T.L., Nguyen, L.H. 2021 First investigation of microbial diversity and biogenic methane potential in coal mines located in the Red River Basin, Vietnam. **International Journal of Coal Geology** 234, 103674
34. **Huang, Z.**, He, X., Nye, C., Bagley, D., Urynowicz, M., Fan*, M. 2021 Effective anaerobic treatment of produced water from petroleum production using an anaerobic digestion inoculum from a brewery wastewater treatment facility. **Journal of Hazardous Materials** 407, 124348
35. Liu, F.J., Guo, J.P., Liu, G.H., Bie, L.L., Zhao, Y.P., **Huang, Z.**, Wei*, X.Y. 2021 Effect of temperature on catalytic hydrocracking of Xiaolongtan lignite over a mesoporous silica-coated Fe₃O₄ supported magnetic solid base for producing aromatics. **Journal of the Energy Institute** 94, 352-359
36. Guo*, H., Han, Q., Zhang, J., Liang, W., **Huang, Z.**, Urynowicz, M.A., Ali, M.I. 2021 Available methane from anthracite by combining coal seam microflora and H₂O₂ pretreatment. **International Journal of Energy Research** 45(2), 1959-1970

37. Guo*, H., Zhang, Y., Zhang, Y., Lia, X., Lia, Z., Liang, W., **Huang, Z.**, Urynowicz, U., Muhammad, A.I. 2021 Feasibility study of enhanced biogenic coalbed methane production by super-critical CO₂ extraction. **Energy** 214, 118935
38. Fatima, B., Liaquat, R., Farooq, U., Jamal, A., Ali, M.I., Liu, F.J., Huan He, H., Guo, H., **Huang*, Z.** 2021 Enhanced biogas production at mesophilic and thermophilic temperatures from a slaughterhouse waste with zeolite as ammonia adsorbent. **International Journal of Environmental Science and Technology** 18(2), 265-274
39. Sadaqat, B., Khatoon, N., Jamal, A., Farooq, U., Ali*, M.I., He, H., Liu, F.J., Guo, H., Urynowicz, M., Wang, Q., **Huang*, Z.** 2020 Enzymatic decolorization of melanin by lignin peroxidase from *Phanerochaete chrysosporium*. **Scientific Reports** 10(1), 1-10
40. Guo*, H., Zhang, Y., Zhang, J., Liang, W., **Huang, Z.**, Urynowicz, U., Muhammad, A.I. 2020 High potential of methane production from coal by in situ fungi and hydrogenotrophic methanogens. **Energy & Fuel** 34, 10958-10967
41. Aziz, A., Ali*, M.I., Farooq, U., Jamal, A., Liu, F.J., He, H., Guo, H., Urynowicz, M., **Huang*, Z.** 2020 Enhanced bioremediation of diesel range hydrocarbons in soil using biochar made from organic wastes. **Environmental Monitoring and Assessment** 192, 1-14
42. Tang, M., Liu, F., He, X., Sun, K., Wang, T., Liu, K., **Huang, Z.**, Fan*, M. 2020 Effective carbon dioxide stabilization of nanofibers electrospun from raw coal tar and polyacrylonitrile. **Journal of Cleaner Production** 276, 123229
43. Liu, F.J., Bie, L.L., Liu, G.H., Guo, J.P., **Huang, Z.**, Zong, Z.M., Wei*, X.Y. 2020 Production of Benzenecarboxylic Acids from Geting Bituminous Coal through Oxidation with NaOCl Enhanced by Pretreatment with H₂O₂. **ChemistrySelect** 5, 8380-8385
44. Sabar, M.A., Ali*, M.I., Fatima, N., Malik, A.Y., Jamal, A., Liaquat, R., Liu, F.J., He, H., Guo, H., Urynowicz, M.A., **Huang*, Z.** 2020 Evaluation of humic acids produced from Pakistani subbituminous coal by chemical and fungal treatments. **Fuel** 278, 118301
45. Guo*, H., Han, Q., Zhang, J., Liang, W., **Huang, Z.**, Urynowicz, M.A. 2020 The effect of NaOH pretreatment on coal structure and biomethane production. **Plos One** 15 (4), e0231623.
46. He, X., Wang, T., Lu, W., Gao, Y., Gong, W., Sun, K., **Huang, Z.**, Goroncy, A.K., Ratnayake, I., Fan*, M. 2020 A Win-Win Method for Generating Carbon Material Precursors of Carbon Nanofibers from Coal and CO₂ and the Associated Mechanism. **Fuel** 272, 117712.
47. He*, H., Zhang, Q., Tang, L., Shi, K.Y., Hong, F.F., Tao, X.X., Ali, M. I., Urynowicz, M., **Huang*, Z.** 2020 Biodegradation of high concentration of benzoic acid with a white-rot fungus *Hypocrea lixii* AH. **Environmental Engineering Science** 37, 482-489
48. Liu, F.J., Liu, G.H., Gasem, K. A.M., Xu, B., Goroncy, A., Tang, M.C., **Huang, Z.**, Fan*, M., Wei, X.Y. 2020 Green and efficient two-step degradation approach for converting Powder

River Basin coal into high-value products and detailed characterization of chemical compositions. **Applied Energy** 264, 114739.

49. Malik, A.Y., Khatoon, N., Jamal, A., Farooq, U., Orem, W.H., Barnhart, E.P., SanFilipo, J.R., Ali*, M.I., **Huang*, Z.** 2020 Coal biomethanation potential of various ranks from Pakistan: A possible alternative energy source. **Journal of Cleaner Production** 255, 120177.
50. He*, H., Zhan, D., Chen, F., **Huang*, Z.**, Huang, H.Z., Wang, A.K., Huang, G.H., Muhammad, I.A., Tai, X. X. 2020 Microbial community succession between coal matrix and culture solution in a simulated methanogenic system with lignite. **Fuel** 264, 116905.
51. Liu, F.J., Gasem, K.A.M., Tang, M., Xu, B., **Huang, Z.**, Zhang, R., Fan*, M. 2020 Enhanced liquid tar production from Powder River Basin coal through CaO catalyzed stepwise degradation in eco-friendly supercritical CO₂/ethanol. **Energy** 191, 116563.
52. **Huang, Z.**, Fan*, M., Tian, H. 2020 Rare earth elements of fly ash from Wyoming's Powder River Basin coal. **Journal of Rare Earths** 38, 219-226.
53. Zhang Q., He*, H., Liu, D., Sun, Q., Huang, H., Zhan, D., **Huang, Z.**, Tao, X.X. 2020 Effect of ash and inorganic minerals in Dalita long-flame coal on biogas production (In Chinese). **Acta Microbiologica Sinica** 6, 1232-1245.
54. Sun, K., Wang, T., Chen, Z., Lu, W., He, X., Gong, W., Tang, M., Liu, F., **Huang, Z.**, Tang, J. Chien, T., Tan, G. and Fan*, M. 2019 Clean and low-cost synthesis of high purity beta-silicon carbide with carbon fiber production residual and a sandstone. **Journal of Cleaner Production**, 238, 117875.
55. Sabar, M.A., Ali*, M.I, Fatima, N., Malik, A.Y., Jamal, A., Farman, M., **Huang*, Z.**, Urynowicz, M. 2019 Degradation of low rank coal by *Rhizopus oryzae* isolated from a Pakistani coal mine and its enhanced releases of organic substances. **Fuel** 253, 257-265.
56. Liu, F., Zong*, Z., Zhu, Y., Wei, X., Zhu, X., Tang, M., **Huang, Z.** 2019 Production of benzene carboxylic acids from two typical Chinese subbituminous coals by liquid phase oxidation in aqueous NaOCl and insights into structural characteristics. **Fuel** 247, 386-394.
57. Guo, H., Zhang, Y., Zhang, J., **Huang, Z.**, Urynowicz, M., Liang*, W., Han, Z., Liu, J. 2020 Characterization of an anthracite degrading methanogenic microflora enriched from Qinshui Basin in China. **Energy & Fuel** 33(7), 6380-6389.
58. Guo, H., Cheng, Y., **Huang, Z.**, Urynowicz, M., Han, Z., Liu, J., Liang*, W. 2019 Factors affecting co-degradation of coal and straw to enhance biogenic coalbed methane. **Fuel** 244, 240-246.
59. Liu, F., Zong*, Z., Li, W., Zhu, X., Wei, X., Tang, M., **Huang, Z.** 2019 A three-step dissociation method for converting Xiaolongtan lignite into soluble organic compounds: insights into chemicals, structural characteristics, and geochemical clues. **Fuel** 242, 883-892.

60. Liu, F., Guo, H., Wang, Q., Haider, R., Urynowicz, M.A., Fallgren, P.H., Jin, S., Tang, M., **Huang***, **Z.** 2019 Characterization of organic compounds from hydrogen peroxide-treated subbituminous coal and their composition changes during microbial methanogenesis. **Fuel** 237, 1209-1216.
61. Wang, Q., Guo, H., Wang, H., Urynowicz, M.A., Hu, A., Yu, C.P., Fallgren, P., Jin, S., Zheng, H., Zeng, R.J., Liu, F., Chen, B., Zhang, R., **Huang***, **Z.** 2019 Enhanced production of secondary biogenic coalbed natural gas from a subbituminous coal treated by hydrogen peroxide and its geochemical and microbiological analyses. **Fuel** 236, 1345-1355.
62. Li, S., Li, W., Liu, B., Liu*, F., Chen, H., Jin, S., Huang, G., **Huang, Z.**, Urynowicz, M.A. 2019 Optimization of Fe²⁺ catalyzed hydrogen peroxide/persulfate and its application in activated carbon regeneration. **Desalination and Water Treatment** 142, 167-178.
63. Liu, F., Gasem, K.M., Tang, M., Goroncy, A., He, Xin., **Huang, Z.**, Sun., K., Fan*, M. 2018 Mild degradation of Powder River Basin coal in environmentally benign supercritical CO₂-ethanol system to produce valuable high-yield liquid tar. **Applied Energy** 225, 460-470.
64. **Huang, Z.**, Liu, F., Chen, L., Fallgren, P., Urynowicz, M., Jin*, S. 2018 Coal-derived compounds and their potential impact on groundwater quality during coalbed methane production. **Environmental Geochemistry and Health** 40(4), 1657-1665.
65. **Huang***, **Z.** 2018 Implication of sustainability by the production of low carbon renewable natural gas from geologic formations. Short Communication. **SF Journal of Environmental and Earth Science** 1(1), 1008.
66. Guo, H., Wang, Q., Urynowicz, A.M., Fallgren, P., Jin, S., Haider, R., **Huang***, **Z.** 2018 Microbial communities involved in methane production from coal treated by potassium permanganate. **Aspects in Mining & Mineral** 1(3), 000512.
67. **Huang, Z.**, Fan*, M., Tian, H. 2018. Coal and coal byproducts: A not only large but also developable unconventional resource for critical materials – rare earth elements. **Journal of Rare Earths** 36 (4), 337-338.
68. Chen, L., Wu*, J., Lu, J., Xia, C., Gao, L., Ma, M., Urynowicz, M.A., **Huang, Z.** 2018. Speciation, fate and transport, and ecological risks of Cu, Pb, and Zn in tailings from Huogeqi Copper Mine, Inner Mongolia, China. **Journal of Chemistry** Article ID 2340542.
69. Hao, X., Zhang, R., He, L., **Huang, Z.**, Wang*, B. 2018. Coverage-dependent adsorption, dissociation and aggregation of H₂O on the clean and pre-adsorbed oxygen Cu (111) surface: A DFT study. **Molecular Catalysis**, 445, pp.152-162.
70. **Huang***, **Z.**, Sednek, C., Urynowicz, M.A., Guo, H., Wang*, Q., Fallgren, P., Jin, S., Jin, Y., Igwe, U., Li, S. 2017. Low carbon renewable natural gas production from coalbeds and implications for carbon capture and storage. **Nature Communications**, 8(1), 568.

71. Zhao, B., Zhang, R., **Huang, Z.**, Wang*, B. 2017. Effect of the size of Cu clusters on selectivity and activity of acetylene selective hydrogenation. **Applied Catalysis A: General**, 546, pp.111-121.
72. Guo*, H., Zhang, J., Han, Q., **Huang, Z.**, Urynowicz, M., Wang, F. 2017. Important role of fungi in the production of secondary biogenic coalbed methane in China's Southern Qinshui Basin. **Energy & Fuel**, 31(7), 7191-7207.
73. Zhang, J., Liu, M., Zhang*, R., Wang, B., **Huang, Z.** 2017. Insight into the properties of stoichiometric, reduced and sulfurized CuO surfaces: structure sensitivity for H₂S adsorption and dissociation. **Molecular Catalysis**, 438, 130-142.
74. Fallgren, P., Bensch, J., Li, S., **Huang, Z.**, Urynowicz, M.A., Jin*, S. 2016. Dosing of ozone in oxidation of methyl tert-butyl ether while minimizing hexavalent chromium formation in groundwater. **Journal of Environmental Chemical Engineering**, 4(4), 4466-4471.
75. Yuan, F., Lei, Y., Wang, Q., Esberg, L.B., **Huang, Z.**, Scott, G.I., Li, X., Ren*, J. 2015. Moderate ethanol administration accentuates cardiomyocyte contractile dysfunction and mitochondrial injury in high fat diet-induced obesity. **Toxicology Letters** 233, 267–277.
76. **Huang*, Z.**, Urynowicz, M.A., Holles, J.H., Pribyl, R.D. 2014. Water adsorption/desorption isotherms for characterization of microporosity in Powder River Basin subbituminous coal. **International Journal of Engineering and Innovative Technology** 3 (12), 337-344.
77. **Huang*, Z.**, Urynowicz, M.A., Colberg, P.J.S. 2013. Bioassay of chemically treated subbituminous coal derivatives using *Pseudomonas putida* F1. **International Journal of Coal Geology** 115, 97-105.
78. **Huang*, Z.**, Urynowicz, M.A., Colberg, P.J.S. 2013. Stimulation of biogenic methane generation in coal samples following chemical treatment with potassium permanganate. **Fuel** 111, 813-819.
79. **Huang, Z.**, Liers, C., Ullrich, R., Hofrichter, M., Urynowicz*, M.A. 2013. Depolymerization and solubilization of chemically pretreated Powder River Basin subbituminous coal by manganese peroxidase (MnP) from *Bjerkandera adusta*. **Fuel** 112, 295-301.

TALKS, INVITED TALKS, & KEYNOTES:

1. Huang, Z. Production of renewable natural gas with carbon capture and storage in Wyoming's Powder River Basin, USA. **Keynote Speaker** at The 11th Symposium on Geomicrobiology of the Chinese Society for Microbiology. Tianjin, China, June 9-11, 2023.
2. Huang, Z. Improved biomethane production through huminite enrichment in lignite treated with hydrogen peroxide. **Invited talk** at The 3rd National Conference on Coalbed Methane Bioengineering. Xi'an, China. April 21-22, 2023.
3. Huang, Z. Renewable natural gas with carbon sequestration in coal and updates in commercialization. **Invited talk** at 2022 International Conference on the Cooperation and Integration of Industry, Education, Research and Application. December 16, 2022.
4. Huang, Z. Progress in commercialization of low-carbon renewable natural gas with synergistic CO₂ geological sequestration. **Invited talk** at The 16th National Conference on Circular Economy and Ecological Industry, hosted by the Chinese Society for Ecological Economics, Industrial Ecology and Technology Professional Committee. Virtual event, December 9, 2022.
5. Huang, Z. Sustainability technology research based on fossil energy/mineral resources. **Invited talk** at Forum for Young Scholars in Resource Chemistry and Materials. Shenyang, China. November 12-13, 2022.
6. Huang, Z., Zhang, W., He, H., Zhang, D. Effects of hydrogen peroxide treatment on the solubilization of macerals of a lignite and biomethane production. **Invited talk** at 38th TSOP Annual Meeting. Virtual Event, September 12-16, 2022.
7. Huang, Z. China's carbon neutralization path. **Keynote Speaker** at Entrepreneurship Challenge Season Demand Matchmaking Meeting. Nanjing, China, November 30, 2021.
8. Huang, Z. Geochemical and microbiological analyses of enhanced biogenic coalbed methane production. **Invited talk** at Engineering Congress on Energy and Environment. Punjab, Pakistan (Virtual Meeting), December 22, 2020.
9. Huang, Z. Biogenic Coalbed Natural Gas Research and Updates of Commercialization. **Invited talk** at 1st Forum of Unconventional Petroleum Research Institute & 3rd Workshop on Unconventional Oil and Gas Development. Beijing, China (Virtual Meeting), December 19, 2020.
10. **Huang, Z.**, Urynowicz, M., Haider, R., Strapoc, D., Guo, H., and He, H. Microbial Community Changes in the Production of Secondary Biogenic Coalbed Methane with Bioaugmentation Coupled with H₂O₂ Pretreatment to Australian Lignite. Goldschmidt. Hawaii, USA (Virtual Meeting), June 21-26, 2020.
11. **Huang, Z.** Sustainable utilization of coal and coal by-products. **Invited talk** at China University of Geosciences, Beijing, China June 22, 2019.

12. **Huang, Z.** Geochemical and microbiological analyses of enhanced biogenic coalbed methane production. **Invited talk** at 8th Geomicrobiology Conference, Qingdao, China June 13-15, 2019.
13. **Huang, Z.** Biogenic Coalbed Natural Gas Research and Updates of Commercialization **Invited talk** at Fujian Agriculture and Forestry University, Fuzhou, China November 28, 2018.
14. **Huang, Z.** Biogenic Coalbed Natural Gas Research and Updates of Commercialization. **Invited talk** at South China University of Technology, Guangzhou, China December 25, 2017.
15. **Huang, Z.** Biogenic Coalbed Natural Gas Research and Updates of Commercialization. **Invited talk** at the China University of Science and Technology, Hefei, Anhui, China September 6, 2017.
16. Fan, M., **Huang, Z.**, Li, K., Tian, H., Luo, Y., Williams, E., Gaustad, G., Adiharma, H., and Radosz, M. An Environmentally Friendly Approach to Recovery of Rare Earth Elements from Coal Production and Utilization Byproducts. 34th Annual International Pittsburg Coal Conference. Pittsburg, PA September 5-6, 2017.
17. Jiang, D., Chen, N., Arthur, Z., Wang, W., Rimal, G., **Huang, Z.**, Fan, M., and Tang, J. Chemical Speciation of Rare Earths in Wyoming Powder River Basin Coal Fly Ashes Rare Earth Research Conference. Ames, IA June 18-22, 2017.
18. **Huang, Z.**, Li, K., Wang, K., Tian, H., Luo, Y., Adidharma, H., Radosz, M., Williams, E., McLaughlin, J.F., Wang, W., Tang, J., and Fan, M. Recovery of rare earth elements (REEs) from Powder River Basin (PRB) coal fly ashes with green and inexpensive technologies. Clearwater Clean Energy Conference. Clearwater, FL June 11-15, 2017.
19. Fan, M., and **Huang, Z.** A pollution prevention and economically viable technology for separation of rare earth elements (REEs) from Powder River Basin coal ashes. Project Review Meeting for Crosscutting Research, Gasification Systems, and Rare Earth Elements Research Portfolios, National Energy Technology Laboratory, Pittsburg, PA March 20-23, 2017.
20. **Huang, Z.** Biogenic coalbed natural gas research and challenges for commercialization. **Invited talk** at Institute of Coal Chemistry, Chinese Academy of Sciences, Taiyuan, China September 12, 2016.
21. **Huang, Z.** Biogenic coalbed natural gas research and challenges for commercialization. **Invited talk** at Institute of Energy Conversion, Chinese Academy of Sciences, Guangzhou, China September 9, 2016.
22. **Huang, Z.** Biogenic coalbed natural gas research and challenges for commercialization. **Invited talk** at Institute of Bioenergy & Bioprocess Technology, Chinese Academy of Sciences, Qingdao, China September 8, 2016.

23. **Huang, Z.** and Urynowicz, M. A shift in methanogenic pathways caused by the treatment of Powder River Basin subbituminous coal by hydrogen peroxide. Goldschmidt. Yokohama, Japan June 26-July 1, 2016.
24. Urynowicz, M. and **Huang, Z.** Low carbon renewable natural gas from depleted fossil fuel reservoirs. Goldschmidt. Yokohama, Japan June 26-July 1, 2016.
25. **Huang, Z.** The biogenic methane potential of coal with hydrogen peroxide as the pretreatment agent. **Invited talk** 4th Annual International Symposium of Clean Coal Technology. Xi'an, Shaanxi, China September 24-26, 2015.
26. **Huang, Z.** Coal bio-gasification with chemical pretreatments. **Invited talk** at General Department of Geology and Minerals of Vietnam, Hanoi, Vietnam September 21, 2015.
27. **Huang, Z.** Enhanced production of biogenic coalbed methane from coals following chemical oxidation. **Invited talk** at 249th ACS National Meeting. Denver, Colorado March 22-26, 2015.
28. **Huang, Z.** Research on secondary biogenic coalbed natural gas. **Invited talk** at Institute of Urban Environment, Chinese Academy of Sciences, Xiamen, China December 31, 2014.
29. **Huang, Z.** Research on secondary biogenic coalbed natural gas. **Invited talk** at College of Environment and Resources, Fuzhou University, Fuzhou, China December 25, 2014.
30. **Huang, Z.** Development and commercialization of biogenic coalbed methane technology. 4th Venture Contest for oversea talents of Fujian Province. Jinjiang, Fujian, China October 25-26, 2014.
31. **Huang, Z.** and Urynowicz, M.A. Enzymatic Conversion of Chemically Pretreated Subbituminous Coal. Goldschmidt, Sacramento, CA, USA June 8-13, 2014.
32. Urynowicz, M., **Huang, Z.** and Sednek, C. Renewable Natural Gas from Unconventional Biogas Reservoirs; The Next Energy Boom? Goldschmidt, Sacramento, CA, USA June 8-13, 2014.
33. **Huang, Z.** and Urynowicz, M.A. Stimulation of biogenic methane generation in coal samples following chemical treatment with potassium permanganate. **Invited talk** at 1st World Congress on Petrochemistry and Chemical Engineering. San Antonio, TX, USA November 18-20, 2013.
34. **Huang, Z.** and Urynowicz, M.A. Bioconversion of a Subbituminous Coal to Methane following Chemical Pretreatment. **Invited talk** at 2nd Annual International Symposium of Clean Coal Technology. Xi'an, Shaanxi, China September 26-28, 2013.
35. **Huang, Z.**, Urynowicz, M.A. and Sednek, C.F. Use of Plant-Derived Carbohydrates as an Alternative Carbon Source for Enhancing the Production of Coalbed Natural Gas. 3rd New Energy Forum. Xi'an, Shaanxi, China September 26-28, 2013.
36. Developing a Technology Business: Energy. Laramie, Wyoming, USA September 20-21, 2012.

37. Clean Coal Technology Research Fund Symposium. Laramie, Wyoming, USA August 20-21, 2012.
38. **Huang, Z.** and Urynowicz, M.A. An Evaluation of Chemical and Enzymatic Pretreatment Agents for the Stimulation of Secondary Biogenic Coal Bed Natural Gas. Secondary Biogenic Coal Bed Natural Gas International Conference. Laramie, Wyoming, USA June 20-21, 2012.
39. Urynowicz, M.A. and **Huang, Z.** Enhancing the Bioavailability of Subbituminous. Goldschmidt. Prague, Czech Republic August 14-19, 2011.
40. **Huang, Z.** and Urynowicz, M.A. An Evaluation of Various Coal Pretreatment Agents for the Stimulation of Secondary Biogenic Coalbed Natural Gas. AWWA/WEF Conference (8th). Albuquerque, New Mexico, USA May 17, 2011.
41. The 4th European Meeting in OxiZymes and the 9th International Symposium on Peroxidases. Leipzig, Germany June 14-16, 2010.
42. Gallagher, L., Marr, J.M., Landkamer, L., Figueroa, L., Glossner, A., Mandernack, K., Harris, S., Liu, Y., Bagley, D.M., Rodgers, W., Basile, F., **Huang, Z.**, Urynowicz, M.A. Enhanced Microbiological Generation of Coalbed Methane. National Meeting of the American Society of Mining and Reclamation. Billings, MT, USA May 30-June 5, 2009.
43. **Huang, Z.** and Urynowicz, M.A. 2009. Feasibility Study for Screening Pretreatment Agents for the Stimulation of Secondary Biogenic Coalbed Natural Gas (CBNG). AWWA/WEF Conference (6th). Laramie, Wyoming, USA May 12, 2009.