

**Chemical methods of uranium separation from
unconventional resources with regard to selected aspects
of the nuclear cycle**

Katarzyna Kiegiel, PhD

Institute of Nuclear Chemistry and Technology

Centre for Radiochemistry and Nuclear Chemistry



Attachement 6

LIST OF SCIENTIFIC OR ARTISTIC ACHIEVEMENTS WHICH PRESENT A MAJOR
CONTRIBUTION TO THE DEVELOPMENT OF A SPECIFIC DISCIPLINE

Warsaw, April 2023

**I. INFORMATION ON SCIENTIFIC OR ARTISTIC ACHIEVEMENTS
SET OUT IN ART. 219 PARA 1. POINT 2 OF THE ACT**

1. Scientific monograph, pursuant to art. 219 para 1. point 2a of the Act – not applicable
2. **Cycle of scientific articles related thematically, pursuant to art. 219 para 1. point 2b of the Act**

[H1] K. Frackiewicz, **K. Kiegiel***, I. Herdzik-Koniecko, E. Chajduk, G. Zakrzewska-Trznadel, S. Wolkowicz, J. Chwastowska, I. Bartosiewicz, *Extraction of Uranium from Low-grade Polish Ores: Dictyonemic shales and Sandstones*, NUKLEONIKA, 2012, 58(4), 451-459.

IF_{2012/2021} = 0.507/1.154 MNiSW_{2012/2021} points = 15/70 no. of citations = 18/15^{a)}

[H2] **K. Kiegiel***, L. Steczek, G. Zakrzewska-Trznadel, *Application of calixarenes as macrocyclic ligands for Uranium(VI) - a review*, JOURNAL OF CHEMISTRY, 2013, Article ID 762819, 16 pages. <https://doi.org/10.1155/2013/762819>

IF_{2013/2021} = 0.622/3.241 MNiSW_{2013/2021} points = 15/40 no. of citations = 26/25^{a)}

[H3] D. Gajda, **K. Kiegiel***, G. Zakrzewska-Kołodziej, E. Chajduk, I. Bartosiewicz, S. Wolkowicz, *Mineralogy and uranium leaching of ores from Triassic Peribaltic Sandstones*, JOURNAL OF RADIOANALYTICAL AND NUCLEAR CHEMISTRY 2015, 303, 521-529. <https://doi.org/10.1007/s10967-014-3362-0>

IF_{2015/2021} = 0.983/1.754 MNiSW_{2015/2021} points = 20/40 no. of citations = 27/24^{a)}

[H4] **K. Kiegiel***, G. Zakrzewska-Kołodziej, D. Gajda, A. Miskiewicz, A. Abramowska, P. Biełuszka, B. Danko, E. Chajduk, S. Wolkowicz, *Dictyonema black shale and Triassic sandstones as potential sources of uranium*, NUKLEONIKA, 2015, 60(3), 515-522. <https://doi.org/10.1515/nuka-2015-0096>

IF_{2015/2021} = 0.585/1.154 MNiSW_{2015/2021} points = 15/70 no. of citations = 5/3^{a)}

* asterisk indicates the corresponding author for the publication concerned

^{a)} Total number of citations based on the Scopus database/number without self-citations
The direct number of citations without self-citations, unavailable for the database, was calculated indirectly (as of April 14, 2023).

[H5] **K. Kiegiel***, A. Abramowska, P. Bieluszka, G. Zakrzewska-Kołtuniewicz, S. Wołkowicz, *Solvent extraction of uranium from leach solutions obtained in processing of Polish low grade ores*, JOURNAL OF RADIOANALYTICAL AND NUCLEAR CHEMISTRY 2017, 311, 589-598. <https://doi.org/10.1007/s10967-016-5029-5>

IF_{2017/2021} =1.181/1.754 MNiSW_{2017/2021} points =15/40 no. of citations =25/24^{a)}

[H6] A. Abramowska, D. Gajda, **K. Kiegiel***, A. Miskiewicz, P. Drzewicz, G. Zakrzewska-Kołtuniewicz, *Purification of flowback fluids after hydraulic fracturing of Polish gas shales by hybrid methods*, SEPARATION SCIENCE AND TECHNOLOGY 2018 53(8):1207-1217. <https://doi.org/10.1080/01496395.2017.1344710>

IF_{2018/2021} =1.354/2.779 MNiSW_{2018/2021} points =25/40 no. of citations =6/6^{a)}

[H7] F. Reitsma*, P. Woods, M. Fairclough, Y. Kim, H. Tulsidas , L. Lopez, Y. Zheng, A. Hussein, G. Brinkmann, N. Haneklaus, A. R. Kacham, T. Sreenivas, A. Sumaryanto, K. Trinopiawan, N. Al Khaledi, A. Zahari, A. El Yahyaoui, J. Ahmad, R. Reyes, **K. Kiegiel**, N. Abbas, D. Mwalongo. E.D. Greaves, *On the Sustainability and Progress of Energy Neutral Mineral Processing*, SUSTAINABILITY 2018, 10, 235. <https://doi.org/10.3390/su10010235>

IF_{2018/2021} =2.592/3.889 MNiSW_{2018/2021} points =70/100 no. of citations =11/10^{a)}

[H8] H. Tulsidas, S. Gabriel, **K. Kiegiel**, N. Haneklaus*, *Uranium resources in EU phosphate rock imports*, RESOURCES POLICY, 2019, 61: 151–156.

<https://doi.org/10.1016/j.resourpol.2019.02.012>

IF_{2019/2021} =3.986/8.222 MNiSW_{2019/2021} points =140/140 no. of citations =27/27^{a)}

[H9] **K.Kiegiel***, D.Gajda, G. Zakrzewska-Kołtuniewicz, *Recovery of uranium and other valuable metals from substrates and waste from copper and phosphate industries*, SEPARATION SCIENCE AND TECHNOLOGY, 2020, 55 (12):2099-2107.

<https://doi.org/10.1080/01496395.2019.1642356>

IF_{2020/2021} =2.475/2.779 MNiSW_{2020/2021} points =40/40 no. of citations =3/2^{a)}

[H10] **K. Kiegiel***, O. Rubinek, D. Gajda, P. Kalbarczyk, G. Zakrzewska-Kołtuniewicz, A. G. Chmielewski, *The studies on uranium recovery from U-bearing Radoniów dump*, NUKLEONIKA 2021 66(4): 115-119. <https://doi.org/10.2478/nuka-2021-0017>

IF₂₀₂₁ =1.154 MNiSW₂₀₂₁points =70 no citations

[H11] **K. Kiegiel***, I. Herdzik-Koniecko, L. Fuks, G. Zakrzewska-Kołtuniewicz, *Management of radioactive waste from HTGR reactors including spent TRISO fuel – state of the art*, ENERGIES 2022, 15(3), 1099. <https://doi.org/10.3390/en15031099>

IF₂₀₂₁ =3.252

MNiSW₂₀₂₁ points =140

no. of citations =3/2^{a)}

3. List of completed original project, engineering and design, technological or artistic achievements, pursuant to art. 219 para 1. point 2c of the Act - not applicable

II. INFORMATION ON SCIENTIFIC OR ARTISTIC ACTIVITY

1. List of published scientific monographs (including the monographs not mentioned in section I.1) – not applicable

2. List of published chapters in scientific monographs

1. **K. Kiegiel***, P. Kalbarczyk, G. Zakrzewska-Kołtuniewicz, #266 *The determination and recovery of radioactive metals from industrial waste stored in Poland*, IAEA, Management of Naturally Occurring Radioactive Material (NORM) in Industry, Proceedings Series - International Atomic Energy Agency, IAEA, Vienna (2022), <http://www-pub.iaea.org/MTCD/Publications/PDF/SupplementaryMaterials/PUB1998.zip> (accessed on 25 February 2023).

2. **K. Kiegiel***, I. Herdzik-Koniecko, G. Zakrzewska-Kołtuniewicz, *Rodział 7: The separation of uranium from the accompanying metals by solvent extraction and ion exchange chromatography*, PET-MOF-CLAENWATER Project, eds. Wojciech Starosta, Bożena Sartowska Instytut Chemii i Techniki Jądrowej, 2020.

3. E. Andreiadis, G. D. Pereira, J. Cha, **K. Kiegiel**, P. Maffia, R. Pattupara, S. Yao, T. Kim, T. Xiong, W. Meng, Y. Yuasa, Z. Faizullayeva, *Change, connect, convince. Innovative communication strategies to nuclear waste management*, NETWORKS FOR NUCLEAR INNOVATION, World Nuclear University, 2019.

4. **K. Kiegiel***, A. Miśkiewicz, I. Herdzik-Koniecko, D. Gajda, G. Zakrzewska-Kołtuniewicz, *Rodział 2 : Perspective of obtaining Rare Earth Elements in Poland*, LANTHANIDES, eds. Nasser S Awwad i Ahmed T. Mubarak IntechOpen, London, United Kingdom, 2019 .ISBN 978-953-51-5792-2. <http://dx.doi.org/10.5772/intechopen.76488>

5. **K. Kiegiel***, A. Miśkiewicz, D. Gajda, S. Sommer, S. Wolkowicz, G. Zakrzewska-Kołtuniewicz, Chapter 4 : *Uranium in Poland: Resources and Recovery from Low-grade Ore*, URANIUM-SAFETY, RESOURCES, SEPARATIONS AND THERMODYNAMIC CALCULATIONS, ed. Nasser S Awwad, IntechOpen, London, United Kingdom, 2018. ISBN 978-1-78923-118-2. <http://dx.doi.org/10.5772/intechopen.69413>
6. G. Zakrzewska-Kołtuniewicz*, **K. Kiegiel**, Wołkowicz, S. *Uranium from domestic resources in Poland*, URANIUM RAW MATERIAL FOR THE NUCLEAR FUEL CYCLE: EXPLORATION, MINING, PRODUCTION, SUPPLY AND DEMAND, ECONOMICS AND ENVIRONMENTAL ISSUES (URAM-2018), IAEA, 2020.
7. **K. Kiegiel***, D.Gajda, G. Zakrzewska-Kołtuniewicz, (2017). *Secondary raw materials as a potential source of uranium*. In Turcu, Ilie (Ed.). Proceedings of NUCLEAR 2017 International Conference on Sustainable Development Through Nuclear Research and Education Part 1/3, (s. 161-166). Romania: Institute for Nuclear Research – Pitesti, 2017.
8. **K. Kiegiel***, G. Zakrzewska-Kołtuniewicz, K. Wołoszczuk, P. Krajewski, M. Poumander, C. Mays, D. Diaconu, *Assessment of Regional Capabilities for New Reactors Development Through an Integrated Approach – Evaluation of Polish Contribution to Alfred Demonstrator*, PROCEEDINGS - ENC 2016, European Nuclear Society, Bruksela 2016, 408-414, ISBN 978-92-95064-27-0.
9. G. Zakrzewska, **K. Kiegiel***, D. Gajda, A. Miśkiewicz, P. Bieluszka, K. Frąckiewicz, I. Herdzik, B. Zielińska, A. Jaworska, K. Szczygłów, A. Abramowska, W. Olszewska, R. Dybczyński, H. Polkowska-Motrenko, B. Danko, Z. Samczyński, E. Chajduk, J. Chwastowska, I. Bartosiewicz, S. Wołkowicz, J. B. Miecznik, *Analysis of the possibility of uranium supply from domestic resources*, str. 212-219, PROCEEDINGS OF THE MINERAL ENGINEERING CONFERENCE MEC2014, Red. M. Lutyński, T.Suponik, Stowarzyszenie Inżynierów i Techników Górnictwa Gliwice, Poland 2014. ISBN 978-83-60837-83-2.
10. G. Zakrzewska*, **K. Kiegiel**, D. Gajda, P. Bieluszka, A. Miskiewicz, B. Danko, E. Chajduk, S. Wolkowicz, *Recovery of valuable metals from the waste deriving from uranium production and processing of secondary materials*, Proceedings – 2014

SUSTAINABLE INDUSTRIAL PROCESSING SUMMIT/SHECHTMAN INTERNATIONAL SYMPOSIUM, edited by Florian Kongoli, FLOGEN, ISBN: 978-1- 987820-11-9, 2014, Vol. 2 Recycling, Secondary Battery, p. 267-277.

11. G. Zakrzewska-Trznadel, **K. Kiegiel***, A. Abramowska, B. Zielinska, P. Bieluszka, Ł. Steczek , E. Chajduk, S. Wolkowicz, *Recovery of uranium from post-leaching solutions by solvent extraction: state of the art and new technological possibilities*, Proceedings of NUCLEAR 2013 The 6th Annual International Conference on Sustainable Development through Nuclear Research and Education. Part 2/3, (p. 161-167). Romania: Institute for Nuclear Research – Pitesti, 2013.

3. Information about membership in editorial boards preparing scientific monographs for publication- - – not applicable

4. List of articles published in scientific journals (including the articles not mentioned in section I.2).

List of articles published after the award the PhD degree

1. A. Boettcher, A. Celińska, M. Frelek-Kozak, M. Migdal, M. P. Dąbrowski, P. Sęktas, A. Sidło, G. Zakrzewska-Kołtuniewicz, D. Wawszczak, M. Brykała, **K. Kiegiel**, A. Miśkiewicz, L. Fuks, I. Herdzik-Koniecko, E. Chajduk, W. Starosta, T. Smoliński, M. Rogowski, A. Pawelec, *Projekt Gospostrateg-HTR: Rezultaty Projektu* (The Gospostrateg-HTR project results), POSTĘPY TECHNIKI JĄDROWEJ, Instytut Chemii i Techniki Jądrowej, PTN, (in Polish), Vol. 66. Z.1, 2023, 9-19.

MNiSW₂₀₁₈ points =5

2. N. Haneklaus*, S. Barbossa, M. D. Basallote, M. Bertau, E. Bilal, E. Chajduk, Y. Chernysh, V. Chubur, J. Cruz, K. Dziarczykowski, P. Fröhlich, P. Grosseau, H. Mazouz, **K. Kiegiel**, J.M. Nieto, S. Pavón, S. Pessanha, A. Pryzowicz, H. Roubík, C.R. Cánovas, H. Schmidt, R. Seeling, G. Zakrzewska-Kołtuniewicz, *Closing the upcoming EU gypsum gap with phosphogypsum*, RESOURCES, CONSERVATION AND RECYCLING 2022, 182, 106328. <https://doi.org/10.1016/j.resconrec.2022.106328>

IF₂₀₂₁ =13.716

MNiSW₂₀₂₁ points = 140

no. of citations =13/13^{a)}

* asterisk indicates the corresponding author for the publication concerned

3. (2022) = [H11] article described in Section I.2

4. L. Fuks*, I. Herdzyk-Koniecko, **K. Kiegiel***, A. Miskiewicz, G. Zakrzewska-Koltuniewicz, *Methods of thermal treatment of radioactive waste*, ENERGIES 2022, 15(1), 375.
<https://doi.org/10.3390/en15010375>

IF₂₀₂₁ = 3.252

MNiSW₂₀₂₁ points = 140

no. of citations = 1/1^{a)}

5. (2021) = [H10] article described in Section I.2

6. (2020) = [H9] article described in Section I.2

7. L. Fuks*, **K. Kiegiel***, A. Miskiewicz, G. Zakrzewska-Koltuniewicz, *Management of Radioactive Waste Containing Graphite: Overview of Methods*, ENERGIES 2020, 13(18), 13184638, <https://doi.org/10.3390/en13184638>

IF₂₀₂₁ = 3.252

MNiSW₂₀₂₁ points = 140

no. of citations = 13/12^{a)}

8. (2019) = [H8] article described in Section I.2

9. (2018) = [H7] article described in Section I.2

10. (2018) = [H6] article described in Section I.2

11. **K. Kiegiel***, D. Gajda, G. Zakrzewska-Koltuniewicz, *Secondary Raw Materials as a Potential Source of Uranium*, JOURNAL OF NUCLEAR RESEARCH AND DEVELOPMENT 15(5), 2018.

MNiSW₂₀₁₈ points = 5/ no data

12. **K. Kiegiel***, G. Zakrzewska-Koltuniewicz, *Zasoby uranu w Polsce – możliwości pozyskiwania uranu ze źródeł niekonwencjonalnych*, POSTĘPY TECHNIKI JĄDROWEJ, Instytut Chemii i Techniki Jądrowej, PTN, (in Polish), Vol. 61. Z.2, 2018, 17-22.

punkty MNiSW₂₀₁₈ = 5/ no data

^{a)} Total number of citations based on the Scopus database/number without self-citations
 The direct number of citations without self-citations, unavailable for the database, was calculated indirectly (as of April 14, 2023).

13. (2017) = [H5] article described in Section I.2

14. (2015) = [H4] article described in Section I.2

15. (2015) = [H3] article described in Section I.2

16. (2013) = [H2] article described in Section I.2

17. **K. Kiegiel**, W. Starosta and J. Leciejewicz*, *Pyrimidine-4-carboxylic acid*, *ACTA CRYSTALLOGRAPHICA SECTION E: STRUCTURE REPORTS ONLINE* 2013, 69(6), o885. <https://doi.org/10.1107/S1600536813012610>

MNiSW_{2013/2021} points =no data/20

no. of citations =1/0^{a)}

18. W. Starosta, J. Leciejewicz*, **K. Kiegiel**, *Tetraaqua(pyrimidine-4,6-dicarboxylato-κ² N 1,O 6)magnesium monohydrate*, *ACTA CRYSTALLOGRAPHICA SECTION E: STRUCTURE REPORTS ONLINE* 2013 Volume 69(4): m189.

<https://doi.org/10.1107/S1600536813005850>

MNiSW_{2013/2021} points = no data/20

no. of citations =1/0^{a)}

19. (2012) = [H1] article described in Section I.2

20. K. Raszplewicz, L. Sikorska, **K. Kiegiel**, T. Bałakier, J. Jurczak*, *Diastereoselective addition of grignard reagents to chiral α-ketoimides derived from Oppolzer's sultam*, *POLISH JOURNAL OF CHEMISTRY*, 2005, 79(12): 1901 – 1907.

IF₂₀₀₅ =0.513

MNiSW₂₀₀₃ points =8/ no data

no. of citations =2/2^{a)}

21. **K. Kiegiel**, T. Bałakier, P. Kwiatkowski, J. Jurczak*, *Diastereoselective allylation of N-glyoxyloyl-(2R)-bornane-10,2-sultam and (1R)-8-phenylmenthyl glyoxylate: Synthesis of (2S,4S)-2-hydroxy-4-hydroxymethyl-4-butanolide*, *TETRAHEDRON ASYMMETRY*, 2004, 15(24): 3869–3878, <https://doi.org/10.1016/j.tetasy.2004.10.025>

IF_{2004/2016} =no data/2.126

MNiSW_{2004/2021} points =no data/40

no. of citations=11/11^{a)}

22. J.M. Troutman, K.A.H. Chehade, **K. Kiegiel**, D.A. Andres, H.P. Spielmann*, *Synthesis of acyloxymethyl ester prodrugs of the transferable protein farnesyl transferase substrate farnesyl methylenediphosphate*, BIOORGANIC AND MEDICINAL CHEMISTRY LETTERS, 2004, 14(19): 4979–4982. <https://doi.org/10.1016/j.bmcl.2004.07.017>

IF_{2004/2020} =no data/2.823 MNiSW_{2004/2021} points =no data/70 no. of citations =18/18^{a)}

23. K.A.H. Chehade, **K. Kiegiel**, R.J. Isaacs, J.S. Pickett, K.E. Bowers, C.A. Fierke, D.A. Andres, H.P. Spielmann*, *Photoaffinity analogues of farnesyl pyrophosphate transferable by protein farnesyl transferase*, JOURNAL OF THE AMERICAN CHEMICAL SOCIETY, 2002, 124(28): 8206–8219. <https://doi.org/10.1021/ja0124717>

IF_{2002/2021} =no data/16,383 MNiSW_{2002/2021} points =no data/200 no. of citations =53/53^{a)}

24. K. Raszplewicz, L. Sikorska, **K. Kiegiel**, J. Jurczak*, *Highly diastereoselective addition of grignard reagents to N-glyoxyloyl-(2R)-bornane-10,2-sultam - Comparative studies*, POLISH JOURNAL OF CHEMISTRY, 2002, 76(11): 1595 - 1600.

IF_{2002/2005} =no data/0.513 MNiSW_{2003/2021} points= 8/no data no. of citations =6/4^{a)}

25. **K. Kiegiel**, P. Prokopowicz, J. Jurczak*, *Diastereoselective addition of allyltrimethylsilane to N-glyoxyloyl(2R)- bornane-10,2-sultam. A new synthesis of (S)-1,2-pentanediol*, SYNTHETIC COMMUNICATIONS, 1999, 29(22): 3999–4005.

IF_{1999/2021} =no data/2.007 MNiSW_{1999/2021} points =no data/40 no. of citations= 14/11^{a)}

26. A. Czapla., A. Chajewski, **K. Kiegiel**, T. Bauer, Z. Wielogorski, Z. Urbanczyk-Lipkowska, J. Jurczak*, *The asymmetric hetero-Diels-Alder reaction and addition of allylic organometallics to 10-N,N-dicyclohexylsulphamoyl-(2R)-isobornyl glyoxylate*, TETRAHEDRON ASYMMETRY, 1999, 10 (11): 2101-2111. [https://doi.org/10.1016/S0957-4166\(99\)00212-8](https://doi.org/10.1016/S0957-4166(99)00212-8)

IF_{1999/2016} =no data/2.126 MNiSW_{1999/2021} points =no data/40 no. of citations = 12/11^{a)}

27. **K. Kiegiel**, J. Jurczak*, *Diastereoselective addition of allylic reagents to chiral α-ketoimides derived from Oppolzer's sultam*, TETRAHEDRON LETTERS, 1999, 40(5): 1009 – 1012. [https://doi.org/10.1016/S0040-4039\(98\)02470-8](https://doi.org/10.1016/S0040-4039(98)02470-8)

IF_{1999/2020} =no data/2.415 MNiSW_{1999/2021} points=no data/70 no. of citations= 22/20^{a)}

List of articles published prior to the award the PhD degree

1. T. Bauer, C. Chapuis*, J. Kiegiel, J. W. Krajewski, **K. Piechota**, Z. Urbanczyk-Lipkowska, J. Jurczak*, *Efficient Preparation and X-Ray Structure Analyses of (2R)-N-pyruvoyl- and (2R)-N-(phenylglyoxyloyl)bornane-10,2-sultam*, HELVETICA CHIMICA ACTA, 1996, 79(4): 1059–1066. <https://doi.org/10.1002/hlca.19960790414>

IF_{1996/2020} =no data/2.164

MNiSW_{1999/2021} points= no data/ 40

no. of citations= 22/20^{a)}

*K. Kiegiel - maiden name **Piechota***

5. List of project, engineering and design as well as technological achievements (including the achievements not mentioned in section I.3) - not applicable.
6. List of public realizations of works of art (including the works not mentioned in section I.3) - not applicable.
7. **Information on presentations given at national or international scientific or arts conferences, including a list of lectures delivered upon invitation and plenary lectures.**

THE RESULTS PRESENTED IN THE FORM OF ORAL PRESENTATIONS
(*only presentation in that I was the presenting author are listed*):

1. K. Kiegiel, L. Maina, G. Zakrzewska-Kołtuniewicz, A. Pryzowicz and K. Dziarczykowski, *Phosphogypsum as Secondary Resource in the Circular Economy*, 4th Edition of Advanced Chemistry World Congress, 28 March 2023 – virtual event, organized byPeers Alley Media, Vancouver BC, Canada, *invited as a speaker*

2. K. Kiegiel, I. Herdzik-Koniecko, L. Fuks, G. Zakrzewska-Kołtuniewicz, *Spent fuel and radioactive waste management in the HTGR fuel cycle*, NUTECH 2020, International Conference, 4-7 October 2020, Warsaw, Poland, *panel session*

3. K. Kiegiel, I. Herdzik-Koniecko, G. Zakrzewska-Kołtuniewicz, *The separation of uranium from the accompanying metals by solvent extraction and ion exchange chromatography*, The 1st Workshop PET-MOF-Cleanwater of cooperative project NCBR (Poland) and NRF (South Africa), 16 October 2019, Warsaw, Poland

4. K. Kiegiel, D. Gajda, P. Kalbarczyk, G. Zakrzewska-Kołtuniewicz, *Comparison of Different Methods for Analysis of Uranium Content in Secondary Raw Materials*, Nuclear 2018, The 11th Annual International Conference on Sustainable Development through Nuclear Research and Education, 23-25 June 2018 Pitesti, Romania, *panel session*
5. K. Kiegiel, D. Gajda, G. Zakrzewska-Kołtuniewicz, *Secondary Raw Materials as a Potential Source of Uranium*, Nuclear 2017, The 10th Annual International Conference on Sustainable Development through Nuclear Research and Education, 24-26 June 2017 Pitesti, Romania - *panel session*
6. K. Kiegiel, D. Gajda, A. Abramowska, A. Miskiewicz & G. Zakrzewska-Kołtuniewicz, *The Recovery of Valuable Metals from Flowback Fluids after Hydraulic Fracturing of Polish Gas-Bearing Shales*. 3rd Annual International Conference on Chemistry & Physics, 20-23 July 2015, Athens, Greece, Chemistry & Physics - *panel session*
7. K. Kiegiel, G. Zakrzewska, D. Gajda, A. Miskiewicz, P. Bieluszak, K. Frackiewicz, I. Herdzik, B. Zielińska, A. Jaworska, K. SzczygłóW, A. Abramowska, W. Olszewska, R. Dybczyński, H. Polkowska-Motrenko, B. Danko, Z. Samczynski, E. Chajduk, J. Chwastowska, I. Bartosiewicz, S. Wołkowicz, J.B. Miecznik, *Analysis of the possibility of uranium supply from domestic resources*, Mineral Engineering Conference MEC2014 consisting of 51th Symposium Physicochemical Problems of Mineral Processing and 19th International Conference of Mineral Processing, 15-18 September 2014, Istebna, Poland - *panel session*
8. K. Kiegiel, G. Zakrzewska, Z. Samczyński, E. Chajduk, J. Chwastowska, I. Bartosiewicz, S. Wołkowicz, J. Miecznik, K. Frackiewicz, B. Zielińska, K. SzczygłóW, I. Herdzik-Koniecko, D. Gajda, A. Jaworska, A. Miśkiewicz, P. Biełuszka, A. Abramowska, W. Olszewska, R. Dybczyński, H. Polkowska-Motrenko, B. Danko, *Extraction of uranium from low-grade uranium ores in Poland*. International Symposium on Uranium Raw Material for the Nuclear Fuel Cycle: Exploration, Mining, Production, Supply and Demand, Economics and Environmental Issues, 23-27 July 2014, Vienna, Austria.
9. K. Kiegiel, Ł. Steczek, G. Zakrzewska, *Zastosowanie kaliks[6]arenów jako makrocyclicznych ligandów kompleksujących uran (Application of calix[6]arenes*

as macrocyclic ligands complexing uranium), Analiza możliwości pozyskiwania uranu dla energetyki jądrowej z zasobów krajowych. Seminarium naukowe w ramach projektu POIG.01.01.02-14-094/09, 19 November 2013, Warsaw, Poland.

10. K. Kiegiel, A. Abramowska, P. Biełuszka, B. Zielińska, E. Chajduk, G. Zakrzewska, *Ekstrakcja uranu z roztworów otrzymanych po jego lugowaniu z rud uranowych z następującą reekstrakcją do fazy wodnej (Extraction of uranium from solutions after its leaching from uranium ores followed by reextraction into the aqueous phase)*, Analiza możliwości pozyskiwania uranu dla energetyki jądrowej z zasobów krajowych. Seminarium naukowe w ramach projektu POIG.01.01.02-14-094/09, 19 November 2013, Warsaw, Poland.

11. K. Kiegiel, G. Zakrzewska-Trznadel, A. Abramowska, B. Zielińska, P. Biełuszka, Ł. Steczek, E. Chajduk, S. Wołkowicz, *Recovery of uranium from post-leaching solutions by solvent extraction: state of the art and new technological possibilities* Nuclear 2013, The 6th Annual International Conference on Sustainable Development through Nuclear Research and Education, 22-24 May 2013, Pitesti, Romania - *panel session*

THE RESEARCH RESULTS PRESENTED AS POSTERS

(only presentation in that I was the presenting author are listed):

1. K. Kiegiel, I. Herdzik-Koniecko, L. Fuks, A. Miskiewicz, G. Zakrzewska-Kołtuniewicz, *Spent fuel and radioactive waste management in the HTGR fuel cycle - Polish Perspective*, International Conference on Radioactive Waste Management: Solution for a Sustainable Future, 1-5 November 2021, Vienna, Austria

2. K. Kiegiel, P. Kalbarczyk, G. Zakrzewska-Kołtuniewicz, *The determination and recovery of radioactive metals from industrial waste stored in Poland*, International Conference on Management Naturally Occuring Radioactive Material (NORM) in Industry, 19-30 October 2020, virtual event organized by IAEA, Vienna, Austria.

3. K. Kiegiel, O. Rubinek, D. Gajda, P. Kalbarczyk, G. Zakrzewska-Kołtuniewicz, A. G. Chmielewski, *The studies on uranium recovery from U-bearing Radoniów dump*, NUTECH 2020, International Conference, 4-7 October 2020, Warsaw, Poland.

4. K. Kiegiel, D. Gajda, G. Zakrzewska-Kołtuniewicz, *Recovery of uranium and other valuable metals from substrates and byproducts used in cooper and phosphate industries*, 5th International Conference on methods and Materials for Separation Processes SEPARATION SCIENCE THEORY AND PRACTICE 2018, 26 – 30 August 2018, Kudowa Zdrój, Poland.
5. K. Kiegiel, D. Gajda, G. Zakrzewska-Kołtuniewicz, *Recovery of uranium and accompanying metals from the secondary raw materials*, URAM-2018, International Symposium on Uranium Raw Material for the Nuclear Fuel Cycle: Exploration, Mining, Production, Supply and Demands, Economics and Environmental Issues, 25-29 July 2018 Vienna, Austria.
6. K. Kiegiel, D. Gajda, G. Zakrzewska-Kołtuniewicz, *Industrial wastes as a potential source of uranium*, NUTECH2017, International Conference, 10-13 September 2017, Cracow, Poland.
7. K. Kiegiel, A. Miskiewicz, K. Iwińska, *Social aspects of the implementation of the Polish Nuclear Power Programme*, RICOMET 2017: Social and ethical aspects of decision-making in radiological risk situations, 26-28 July 2016, Vienna, Austria.
8. K. Kiegiel, G. Zakrzewska-Kołtuniewicz, K. Wołoszczuk, P. Krajewski, M. Poumadère, C. Mays, D. Diaconu, *Assessment of Regional Capabilities for New Reactors Development Through an Integrated Approach – Evaluation of Polish Contribution to Alfred Demonstrator*, European Nuclear Conference 2016, 9-13 October 2016, Warsaw, Poland.
9. K. Kiegiel, G. Zakrzewska-Kołtuniewicz, K. Wołoszczuk, P. Krajewski, *Analiza krajowych i regionalnych struktur wspierających rozwój programów badań jądrowych poprzez zastosowanie zintegrowanego podejścia (Assessment of regional capabilities for new reactors development through an integrated approach)*, MĄDRALIN 2015, Wybrane Aspekty Bezpieczeństwa Elektrowni Jądrowej w Polsce, 24-25 November 2015, Warsaw, Poland.
10. K. Kiegiel, D. Gajda, A. Abramowska, A. Miśkiewicz, A. Oszczak, G. Zakrzewska-Kołtuniewicz, *Uran z łupków gazonośnych?(Uranium from gas-bearing shales?)*,

MĄDRALIN 2015, Wybrane Aspekty Bezpieczeństwa Elektrowni Jądrowej w Polsce, 24-25 November 2015, Warsaw, Poland.

11. K. Kiegiel, D. Gajda, I. Herdzik-Koniecko, G. Zakrzewska-Kołtuniewicz, *Odzysk uranu i metali towarzyszących z odpadów przemysłowych różnego pochodzenia (Recovery of uranium and accompanying metals from various types of industrial wastes)*, MĄDRALIN 2015, Wybrane Aspekty Bezpieczeństwa Elektrowni Jądrowej w Polsce, 24-25 November 2015, Warsaw, Poland.

12. K. Kiegiel, G. Zakrzewska-Kołtuniewicz, D. Gajda, A. Miśkiewicz, A. Abramowska, P. Biełuszka, B. Danko, E. Chajduk, S. Wołkowicz, *Dictyonema black shale and Triassic sandstones as potential sources of uranium*, International Conference on Development and Applications of Nuclear Technologies NUTECH 2014, 21-24 September 2014, Warsaw, Poland.

13. K. Kiegiel, G. Zakrzewska, Z. Samczyński, E. Chajduk, J. Chwastowska, I. Bartosiewicz, S. Wołkowicz, J. Miecznik, K. Frackiewicz, B. Zielińska, K. Szczygłó, I. Herdzik-Koniecko, D. Gajda, A. Jaworska, A. Miskiewicz, P. Bieluszak, A. Abramowska, W. Olszewska, R. Dybczyński, H. Polkowska-Motrenko, B. Danko, *Extraction of uranium from low-grade uranium ores in Poland*, URAM-2014 International Symposium on Uranium Raw Material for the Nuclear Fuel Cycle: Exploration, Mining, Production, Supply and Demand, Economics and Environmental Issues, 23-27 June 2014, Vienna, Austria.

14. Zakrzewska-Trznadel, A. Miskiewicz, A. Jaworska, K. Kiegiel, *Włączanie Nowych Krajów Członkowskich Unii Europejskiej w Struktury Zaawansowanych Badań w Ramach Euratomu (New Ms Linking for an Advanced Cohesion in Euratom (Newlancer)*, MĄDRALIN 2013, Nauka i Technika wobec Wyzwania Budowy Elektrowni Jądrowej z Zasobów Krajowych, 13-15 February 2013, Warsaw, Poland.

15. G. Zakrzewska-Trznadel, K. Kiegiel, K. Frąkiewicz, I. Herdzik, B. Zieliński, P. Biełuszka, D. Gajda, A. Miśkiewicz, A. Jaworksa, K. Szczygłó, A. Abramowska, R. Dybczyński, B. Danko, H. Polkowska-Motrenko, Z. Samczyński, E. Chajduk, J. Chwastowska, I. Bartosiewicz, S. Wołkowicz, J.B.Miecznik, *Analiza Możliwości Pozyskania Uranu dla Energetyki Jądrowej z Zasobów Krajowych (Analysis of the possibility of uranium supply*

from domestic resources), MAĐRALIN 2013, Nauka i Technika wobec Wyzwania Budowy Elektrowni Jądrowej z Zasobów Krajowych, 13-15 February 2013, Warsaw, Poland.

16. K. Kiegiel, K. Frackiewicz, G. Zakrzewska-Trznadel, D. Gajda, E. Chajduk, I. Bartosiewicz, S. Wołkowicz, *Leaching of Uranium from Triassic Peribaltic Sandstones*, ATALANTE 2012 – Nuclear Chemistry for Sustainable Fuel Cycles, 2-7 September 2012, Montpellier, France.

17. K. Kiegiel, P. Spielmann, *The synthesis of farnesyl diphosphate analogs*, University of Kentucky, Department of Biochemistry, 2000 Summer Research Conference, 17-18 August 2000, Cumberland Falls State Resort Park, USA.

18. K. Kiegiel, T. Bauer, J. Jurczak, *Badanie indukcji asymetrycznej w reakcjach addycji do grupy karbonylowej pochodnych N-glioksyloilo-(2R)-bornano-10,2-sultamu (Study of asymmetric induction in addition reactions to the carbonyl group of N-glyoxyloyl-(2R)-bornane-10,2-sultam derivatives)*, V Ogólnopolskie Sympozjum Chemii Organicznej, Instytut Chemii Organicznej PAN, 11-14 November 1998, Konstancin-Jeziorna, Poland.

19. K. Kiegiel, J. Jurczak, Preparation of nonracemic 2,4-disubstituted 4-butanolides by chiral auxiliary-mediated stereoselective iodolactanization, XIIth International Conference on Organic Synthesis, (ICOS-12), Department of Industrial and Organic Chemistry University of Milano, 28.06-2 July 1998, Venice, Italy.

PRESENTATIONS OF RESULTS PRESENTED AT OTHER CONFERENCES
(presentations of which I am a co-author)

1. G. Zakrzewska-Kołtuniewicz, S. Wołkowicz, K. Kiegiel, *Uranium from domestic resources in Poland*. Uranium raw material for the nuclear fuel cycle: Exploration, mining, production, supply and demand, economics and environmental issues (URAM-2018). International Symposium, 25-29 July 2018, Vienna, Austria.

2. F. Reitsman, M. Fairclough, H. Tulsidas, L. López, Y. Zheng, A. Hussein, G. Brinkmann, N. Haneklaus, A.R. Kacham, T. Sreenivas, A. Sumaryanto, K. Trinopiawan, N. Al Khaledi, A. Zahari, G. Alonso, A. El Yahyaoui, J. Ahmad, R. Reyes, K. Kiegiel, K. N. Abbas,

D. Mwalongo, E.D. Greaves, *Energy neutral mineral processing to support climate change mitigation*, International Conference on Climate Change and the Role of Nuclear Power, 7-11 October 2019, Vienna, Austria.

3. A. Miśkiewicz, K. Kiegiel, D. Gajda, G. Zakrzewska-Kołtuniewicz, *Recovery of uranium and other valuable metals from phosphate rocks using the membrane contractor*. Euromembrane 2018, 9-13 July 2018, Valencia, Spain.

4. D. Gajda, A. Abramowska, A. Miśkiewicz, K. Kiegiel, B. Filipowicz, G. Zakrzewska-Kołtuniewicz, *Pre-treatment of radioactive waste using destructive processes of organic compounds followed by concentration of radionuclides*, NUTECH-2017. International Conference on Developments and Applications of Nuclear Technologies, 10-13 September 2017, Cracow, Poland.

5. D. Gajda, K. Kiegiel, A. Miśkiewicz, A. Abramowska, E. Chajduk, S. Wołkowicz, M. Koniecznyńska, G. Zakrzewska-Kołtuniewicz, *Possibility of uranium recovery from Polish unconventional resources*, ENC 2016 European Nuclear Conference, 9-13 October 2016, Warsaw, Poland.

6. A. Abramowska, D. Gajda, K. Kiegiel, A. Miśkiewicz, G. Zakrzewska-Kołtuniewicz. *Treatment of radioactive wastewater by hybrid methods*, ENC 2016 European Nuclear Conference, 9-13 October 2016, Warsaw, Poland.

7. A. Abramowska, D. Gajda, K. Kiegiel, A. Miśkiewicz, P. Drzewicz, G. Zakrzewska-Kołtuniewicz, *Purification of flowback fluids after hydraulic fracturing of Polish gas shales by hybrid methods*. The IVth International Conference on Methods and Materials for Separation Processes “Separation science – theory and practice 2016”, 4-8 September 2016, Brunów (Lwówek Śląski), Poland.

8. D. Gajda, G. Zakrzewska-Kołtuniewicz, K. Kiegiel, B. Danko, E. Chajduk, I. Bartosiewicz, *Oddzielanie związków uranu od metali towarzyszących z roztworów otrzymanywanych po ługowaniu piaskowców pochodzących z polskich złóż, metodą chromatografii jonowymiennej*, XI Warszawskie Seminarium Doktorantów i Chemików ChemSession'14, 16 May 2014, Warsaw, Poland.

9. K. Wołoszczuk, P. Krajewski, G. Zakrzewska, K. Kiegiel, Assessment of regional capabilities for new reactors development through an integrated approach, NUTECH-2014 International Conference on Development and Applications of Nuclear Technologies, 21-24 September 2014, Warsaw, Poland.

10. D. Gajda, G. Zakrzewska-Kołtuniewicz, K. Kiegiel, M. Harasimowicz, P. Biełuszka, B. Danko, E. Chajduk, D. Wawszczak, A. G. Chmielewski, *Uranium as a by-product with possible recovery of accompanying metals*, International Conference: Metallurgy of Non-ferrous Metals, 17-19 November 2014, Cracow, Poland.

11. D. Gajda, G. Zakrzewska, K. Kiegiel, A. Miśkiewicz, P. Biełuszka, K. Frąckiewicz, I. Herdzik, K. Szczygłów, A. Abramowska, W. Olszewska, M. Harasimowicz, R. Dybczyński, H. Polkowska-Motrenko, B. Danko, I. Bartosiewicz, S. Wołkowicz, J.B. Miecznik, *Dictyonema black shale and Triassic sandstones as a potential source of uranium*, NUTECH-2014 International Conference on Development and Applications of Nuclear Technologies, 21-24 September 2014, Warsaw, Poland.

12. D. Gajda, G. Zakrzewska, K. Kiegiel, R. Dybczyński, B. Danko, Z. Samczyński, E. Chajduk, *The study on uranium extraction and purification*, NUTECH-2014 International Conference on Development and Applications of Nuclear Technologies, 21-24 September 2014, Warsaw, Poland.

13. W. Olszewska, K. Kiegiel, D. Gajda, G. Zakrzewska, A. Abramowska, S. Wołkowicz, *Projekt procesowy instalacji pozyskiwania uranu z rud uranowych i analiza kosztów (Design process of the installation for obtaining uranium from uranium ores and analysis of costs)*, Analiza możliwości pozyskiwania uranu dla energetyki jądrowej z zasobów krajowych. Seminarium naukowe w ramach projektu POIG.01.01.02-14-094/09, 19 November 2013, Warsaw, Poland,.

14. D. Gajda, G. Zakrzewska-Trznadel, K. Kiegiel, B. Danko, E. Chajduk, I. Bartosiewicz, *Oddzielenie związków uranu od metali towarzyszących z roztworów otrzymanych po lugowaniu piaskowców pochodzących z polskich złóż, metodą chromatografii jonowymiennej (Separation of uranium and accompanying metals from a solution after leaching of uranium*

ores with the use of ion exchangers of Dowex type), ChemSession'13. X Warszawskie Seminarium Doktorantów Chemików, 17 May 2013, Warsaw, Poland.

15. D. Gajda, G. Zakrzewska, K. Kiegiel, K. Frąckiewicz, K. SzczygłóW, E. Chajduk, I. Bartosiewicz, I. Herdzyk-Koniecko, *Ługowanie uranu i innych pierwiastków towarzyszących z piaskowców Syneklizy Perybaltyckiej oraz łupków dictyonemowych Obniżenia Podlaskiego (Leaching of uranium and other accompanying elements from sandstones of the Peribaltic synecline and dictyonema shales from the Podlasie depression)*, Analiza możliwości pozyskiwania uranu dla energetyki jądrowej z zasobów krajowych. Seminarium naukowe w ramach projektu POIG.01.01.02-14-094/09, 19 November 2013, Warsaw, Poland.

16. D. Gajda, B. Danko, G. Zakrzewska-Trznadel, K. Kiegiel, E. Chajduk, I. Bartosiewicz, Z. Samczyński, *The study of sandstone rocks as a potential source of uranium from domestic deposits*, European Nuclear Young Generation Forum, 17-20 June 2013, Stockholm, Sweden.

17. A. Abramowska, K. Kiegiel, G. Zakrzewska, Z. Samczyński, W. Skwara, *Precypitacja prekursorów oktatlenku triuranu do produkcji paliwa jądrowego (Precipitation of precursors of triuranium octa-oxide for nuclear power engineering)*, Analiza możliwości pozyskiwania uranu dla energetyki jądrowej z zasobów krajowych. Seminarium naukowe w ramach projektu POIG.01.01.02-14-094/09, 19 November 2013, Warsaw, Poland.

18. A. Abramowska, K. Kiegiel, D. Gajda, K. SzczygłóW, G. Zakrzewska-Trznadel, E. Chajduk, S. Wołkowiez, *Otrzymywanie czystego tlenku uranu do produkcji paliwa jądrowego z krajowych zasobów rud uranowych (Obtaining of pure uranium oxide to produce nuclear fuel from domestic resources of uranium ores)*, VI Krajowa Konferencja Radiochemii i Chemii Jądrowej, 21-24 April 2013, Cracow-Przegorzały, Poland.

19. K. Frąckiewicz, K. Kiegiel, I. Herdzyk-Koniecko, E. Chajduk, G. Zakrzewska-Trznadel, S. Wołkowiez, J. Chwastowska, I. Bartosiewicz, *Extraction of uranium from low-grade Polish ores: dictyonemic shales and sandstones*, International Conference on Development and Applications of Nuclear Technologies NUTECH-2011, 11-14 September 2011, Cracow, Poland.

20. K. Szczygłów, G. Zakrzewska-Trznadel, K. Frąckiewicz, K. Kiegiel, D. Gajda, E. Chajduk, S. Wołkowicz, R. Miecznik, *Uranium from black shales and sandstones for Polish nuclear power*. 7th International PhD Students and Young Scientists Conference: Young Scientists Towards the Challenges of Modern Technology, 17-20 September 2012, Warsaw, Poland.
21. D. Gajda, G. Zakrzewska-Trznadel, K. Kiegiel, I. Herdzik-Koniecko, E. Chajduk, J. Dudek, B. Danko, *Study on the separation of uranium and associated metals by solid-liquid extraction followed by ion-exchange process.*, 22-24 May 2012, Warsaw, Poland.
22. D. Gajda, G. Zakrzewska-Trznadel, K. Kiegiel, K. Frąckiewicz, E. Chajduk, I. Bartosiewicz, *Ługowanie rud uranowych z krajowych złóż (Leaching of uranium ores from domestic deposits)*, ChemSession'12: IX Warszawskie Seminarium Doktorantów Chemików, 10 May 2012, Warsaw, Poland.
23. D. Gajda, G. Zakrzewska-Trznadel, B. Danko, K. Kiegiel, K. Szczygłó
24. D. Gajda, K. Kiegiel, K. Frąckiewicz, E. Chajduk, I. Bartosiewicz, G. Zakrzewska-Trznadel, J. Chwastowska, *Ługowanie rud piaskowców uranonośnych pochodzących z krajowych złóż (Leaching of uranium-bearing sandstone ores from domestic deposits)*, Seminarium naukowe w ramach projektu POIG.01.02-14-094/09: „Analiza możliwości pozyskiwania uranu dla energetyki jądrowej z zasobów krajowych”, 21 June 2012, Warsaw, Poland.
25. G. Zakrzewska-Trznadel, K. Frąckiewicz, I. Herdzik-Koniecko, K. Kiegiel, D. Gajda, E. Chajduk, *Leaching of uranium ores from Polish deposits*. Third General Assembly of the Sustainable Nuclear Energy Technology Platform, 29-30 November 2011, Warsaw, Poland.

26. L. Steczek, G. Zakrzewska-Trznadel, K. Kiegiel *Synthesis of Calix[6]arenes as carriers for separation of uranium from aqueous solutions*, ChemSession'11: VIII Warszawskie Seminarium Doktorantów Chemików, 13 May 2011, Warsaw, Poland.

LECTURES AND SEMINARS DELIVERED OUT OF INCT

(that were delivered by dr. K. Kiegiel)

1. K. Kiegiel A. Miskiewicz, I. Herdzik-Koniecko, L. Fuks, G. Zakrzewska-Kołtuniewicz, A.G. Chmielewski, *Triso Fuel Management Depending on the Choice of the Fuel Cycle - Research Currently Conducted at INCT in Poland*. Technical Meeting on Back End of the Fuel Cycle Considerations for Small Modular Reactors, 19-24 September 2022, Vienna, Austria.

2. G. Zakrzewska-Kołtuniewicz, L. Fuks, K. Kiegiel, A. Miskiewicz, I. Herdzik-Koniecko, *Management of Wastes Containing Long-lived Alpha Emitters: Characterization, Processing and Storage, Annual Progress Report*. Third Research Coordination Meeting for "Management of Wastes Containing Long-lived Alpha Emitters: Characterization, Processing and Storage", 12-15 October 2021, Vienna, Austria.

3. K. Kiegiel, D. Gajda, G. Zakrzewska-Kołtuniewicz, *Recovery of uranium and accompanying metals from various types of industrial wastes - Current status of the project*, Third Research Coordination Meeting (RCM) on Uranium/Thorium fuelled High Temperature Gas Cooled Reactor Applications for energy neutral and Sustainable Comprehensive Extraction and Mineral Product Development Process, 2-6 July 2018 Vienna, Austria.

4. K. Kiegiel, G. Zakrzewska-Kołtuniewicz, M. Brykała, A.G. Chmielewski, *Research on an Advanced Fuel Cycle on-going at INCT and Perspective of Fuel Management in Poland*, Technical Meeting on Advanced Fuel Cycles to Improve the Sustainability of Nuclear Power through the Minimization of High Level Waste, 17–19 October 2017, Vienna, Austria.

5. K. Kiegiel, D. Gajda, G. Zakrzewska-Kołtuniewicz, *Secondary raw materials as a potential source of uranium and accompanying metals*, Second Research Coordination Meeting (RCM) on Uranium/Thorium fuelled High Temperature Gas Cooled Reactor Applications for energy

neutral and Sustainable Comprehensive Extraction and Mineral Product Development Process, 3-6 July 2017, Vienna, Austria.

6. K. Kiegiel, G. Zakrzewska-Kołtuniewicz, D. Gajda, H. Polkowska-Motrenko, *Recovery of uranium and accompanying metals from various type of industrial waste*, 1st RCM on Uranium/Thorium fuelled High Temperature Gas Cooled Reactor Applications for Energy Neutral and Sustainable Comprehensive Extraction and Mineral Product Development Processes, 2-5 November 2015, Vienna, Austria.

7. K. Kiegiel, G. Zakrzewska, *Licensing framework in Poland*, ARCADIA 1st Technical Meeting - Arcadia Project, 11-13 June 2014, Bologna, Italy.

8. Information on participation in organizational and scientific committees at national or international conferences, including the applicant's function.

1. NUTECH-2020 International Conference on Development and Applications of Nuclear Technologies, 4-7 October 2020, Warsaw, Poland, **member** of the organizing committee.

2. Meeting “Mental models of ionizing radiation as a tool to build communication with the public – evaluation of research carried out within the EAGLE project”, 27 January 2016, Warsaw, Poland, **member** of the organizing committee.

3. Seminar “Selected Aspects of Implementation Of Gen III/IV in NMS” In the frame of the FP7 Programme “Assessment of Regional Capabilities for New Reactors Development Through an Integrated Approach (ARCADIA)”, 1 October 2015, Warsaw, Poland, **chairman** of the organizing committee.

4. 2nd Annual Arcadia Meeting, 29-30 September 2015, Warsaw, Poland, **chairman** of the organizing committee.

5. Seminar “The use of mathematical models to study the socio-economic effects of the implementation of the Polish Nuclear Power Programme” in the frame of the project “studying the social and socio-economic effects of the implementation of the Polish Nuclear

Power Programme using new methodology” IAEA CRP 18541/RO), 31 July 2015, Warsaw, Poland, **member** of the organizing committee.

6. Meeting “Mass media and the information regarding the implementation of the Polish nuclear power programme” in the frame of the project EAGLE (Enhancing Education, Training and Communication Processes for Informed Behaviors and Decision-Making Related to Ionizing Radiation Risks), 2 July 2015, Warsaw, Poland, **member** of the organizing committee.

7. Meeting “Mass media and communication: building a national dialogue. Dialogue in Poland” within the EAGLE project – Enhancing Education, Training and Communication Processes for Informed Behaviors and Decision-Making Related to Ionizing Radiation Risks), 9 July 2014, Warsaw, Poland, **member** of the organizing committee.

8. Meeting “Mass media and communication: building a national dialogue. Dialogue in Poland” within the EAGLE project – Enhancing Education, Training and Communication Processes for Informed Behaviors and Decision-Making Related to Ionizing Radiation Risks), 29 May 2014, Warsaw, Poland, **member** of the organizing committee.

9. Project meeting no 2 within the PLATENSO project – Building a Platform for Enhanced Societal Research Related to Nuclear Energy in Central and Eastern Europe, 12-13 May 2014, Warsaw, Poland, **member** of the organizing committee.

10. Scientific Seminar on “Analysis of the Possibility of Uranium Supply from Domestic Resources”, 19 November 2013, Warsaw, Poland, **member** of the organizing committee.

11. Expert group meeting within the FP7 EU project NEWLANCER (NEW MS LINKING FOR AN ADVANCED COHESION IN EURATOM RESEARCH), 28 February 2013, Warsaw, **member** of the organizing committee.

9. Information on participation in the works of research teams realizing projects financed through national and international competitions, including the projects which have been completed and projects in progress, and information on the function performed in the team.

ONGOING PROJECTS:

- (2022-2025) ERA-MIN 3, EU co-funded ERA-MIN “Phosphogypsum Processing to Critical Raw Materials” PG2CRM, **team leader at INCT**
- (2022-2025) HORIZON-EURATOM-2021-NRT-01-05 Type of Action: EURATOM-RIA: „GEMINI For Zero Emission” GEMINI 4.0), **team leader at INCT**
- (2022-2024) Mobility project *BeeWatch/Using Honeybees, Honey and Other Hive Products for Biomonitoring of Low-radioactive Phosphogypsum Tailings*, finansowanym przez the German Federal Ministry of Education and Research (BMBF), **contractor**

COMPLETED PROJECTS:

After the award the PhD degree:

- (2019-2022) IAEA Research Contract No 23022 Management of radioactive organic waste containing long-lived alpha emitters, IAEA’s Coordinate Research Project T13017 Management of wastes containing long-lived alpha emitters: characterization, processing and storage, **contractor**
- (2019-2022) National Strategic Programme GOSPOSTRATEG „Preparation of legal, organizational and technical instruments for the HTR implementation”, **contractor**
- (2018-2019) COST nr ES1407: "European network for innovative recovery strategies of rare earth and other critical metals from electric and electronic waste (ReCrew)" **member of Management Committee**
- (2015-2019) IAEA Research Contract No. IAEA-RC-18542 Recovery of uranium and accompanying metals from various types of industrial wastes, IAEA’s Coordinate Research Project T11006 entitled “Uranium/Thorium Fuelled High Temperature Gas Cooled Reactor Applications for Energy Neutral and Sustainable Comprehensive Extraction and Mineral Product Development Processes”, **team leader at INCT**

- (2015-2019) International Projects Co-Funded by the Ministry of Science and Higher Education, Recovery of uranium and accompanying metals from various types of industrial wastes, **team leader at INCT**
- (2014-2015) Innotech Projects Granted by the National Centre for Research and Development, Conspan BlueGas – technology for treatment of flowback fluids from gas-bearing shales hydraulic fracturing with water recycling and reclamation of valuable metals, **contractor**
- (2013-2016) FP7 – Assessment of regional capabilities for new reactors development through an integrated approach (ARCADIA), **contractor**
- (2011–2013) POIG 01.01.02-14-094-09-00 „Analysis of the possibilities of uranium supply from domestic resources”, **contractor**

Prior to the award the PhD degree:

- (1995-1999) KBN nr 3 T09 A 011 12 – Research grant (supervisor project) "Use of N-glyoxyloyl derivatives of (2R)-bornane-10,2-sultam in asymmetric additions of organometallic compounds to the carbonyl group”, **contractor**

10. Membership in international or national organizations and scientific societies, including the functions performed by the applicant.

- Polskie Towarzystwo Nukleoniczne (Polish Nuclear Society) - **member**
- WiN Poland - **member**
- Rada Naukowa IChTJ (INCT Scientific Council) - **secretary of the Scientific Council** since 2014
- EGRM (UNECE) - **member of the Expert Group on Resource Management** (2019-2024)

11. Information on internships completed in scientific or artistic institutions, also abroad, including the place, time and duration of the internship and its character.

After the award the PhD degree:

1. Scientific internship within the project Modern spent fuel DISolution and chemistry in failed COnainer conditions, Grant Agreement: 755443- (DisCo - JRC In-situ Individual Training 2019, 11 November– 6 December 2019, Karlsruhe, Germany

Hosting unit JRC.G.III.8 – Waste Management, project coordinator: P. Carbol, PhD; supervisor: D.Papaioannou, PhD

During the internship, I got familiar with the currently conducted research in the field of non-destructive characterization of spent nuclear fuel.

2. World Nuclear University Summer Institute 2019; 23 July-27 June 2019 Bucharest Romania, (3 weeks) Switzerland, Baden, (2 weeks). The WNU Summer Institute provided intensive training, during which i met the full spectrum of issues surrounding nuclear energy a Lectures and training were conducted by world's foremost experts and leaders in the field of science, engineering and nuclear business. In addition to lectures, there were numerous practical workshops, interactive platforms and visit to nuclear facilities. The training was an opportunity for me to develop leadership, communication, planning and organization skills, but also to work in a team of specialists from different countries.

3. Scientific internship: 31 March -5 April 2019, Laboratorium Analiz Promieniotwórczości, The H. Niewodniczański Institute of Nuclear Physics Polish Academy of Science, Cracow, Poland – supervisor prof. dr hab. Jerzy W. Mietelski. During the internship, I was trained in the preparation of samples for alpha analysis. These were practical works and discussions. A week-long internship allowed me to meet with the "know-how" of the laboratory headed by prof. dr hab. Jerzy W. Mietelski

4. The scientific trip of IChTJ employees to nuclear facilities in France, Program: Visit CEA Marcoule, Visit the Atalante installation, Visit the Tricastine Nuclear Power Plant and the Fuel Enrichment Plant 13-17 November 2011.

The visit to nuclear facilities in France was a practical training on the functioning of facilities related to nuclear power, safety rules, protection against radiation and radioactive waste management.

5. Postdoctoral contract, University of Kentucky, Department of Molecular and Cellular Biochemistry, Lexington, KY USA, supervisor: prof. H Peter Spielmann, 1 April 2000 -31 July 2001

I joined to the group realizing a project on the study of biological activity of farnesyl pyrophosphate analogues. My task was to synthesize FPP derivatives. The results of these works are two articles published in 2002 (Journal of the American Chemical Society) and 2004 (Bioorganic and Medicinal Chemistry Letters), in that I am a co-author.

Prior to the award the PhD degree:

1. Internship at Institute of Organic Chemistry Polish Academy of Science: July 1 – September 30 1995, Warsaw, Poland, Poland supervisor prof. dr hab. Janusza Jurczaka

My work was related the organic synthesis. I cooperated with experienced scientists dealing with the subject of stereocontrolled organic synthesis.

2. III Zimowa Szkoła Nowoczesnej Chemii Organicznej (III Winter School of Modern Organic Chemistry) organized by Institute of Organic Chemistry Polish Academy of Science, February 28 – March 5 1994, Szczyrk, Poland - student

The participation in the training allowed me to familiarize myself with selected issues of organic chemistry, e.g. modern methods of organic synthesis, planning of synthesis, application of modern spectroscopic methods to determine the structure of molecules of organic compounds.

12. Membership in editorial committees and scientific boards of journals, including the functions performed by the applicant (e.g. editor-in-chief, chairman of scientific board etc.).

- Guest Editor Special Issue Energies, MDPI "Storage and Disposal Options for Nuclear Waste"

*Editorial: K. Kiegiel**, Storage and Disposal Options for Nuclear Waste, ENERGIES 2022, 15(13), 4665. <https://doi.org/10.3390/en15134665>

- Guest Editor Special Issue Energies, MDPI " Storage and Disposal Options for Nuclear Waste II" - *deadline for manuscript submissions 30 June 2023.*

13. Information on scientific or artistic works reviewed, in particular those published in international journals.

Journal	Number of reviews done
Journal of Radioanalytical and Nuclear Chemistry	10 reviews
Nukleonika	2 reviews
Polyhedron	1 review
Molecules	1 review
Industrial & Engineering Chemistry Research	1 review
Environmental Nanotechnology, Monitoring and Management	1 review
Journal of Material Cycle and Waste Management	1 review

14. Information on participation in European or other international programmes - not applicable

15. Information on participation in research teams realizing projects other than those defined in section II.9 - not applicable

16. Information on membership in the teams assessing applications for financing of research projects, applications for scientific awards, applications in other competitions of scientific or didactic character - not applicable

III. INFORMATION ON COOPERATION WITH SOCIAL AND ECONOMIC ENVIRONMENT

1. List of technological works - not applicable

2. Information on cooperation with economic sector

In 2014-2015, I was a contractor in the NCBiR BLUE GAS project - Conspan-BlueGas - a technology for purifying flowback fluids after hydraulic fracturing of gas-bearing shales with the possibility of water reuse and metal recovery. The leader of the consortium (Pyrocat-PIG-ICH TJ) was Pyrocat Catalyse World sp z o. o. As a contractor, I cooperated with enterprise, I was carrying out the laboratory tests conducted in order to develop guidelines for a prototype installation enabling the cleaning and reuse of flowback fluids resulting from hydraulic fracturing.

In 2021, I started cooperation with Biopolimex Sp. z o. o. Together with foreign partners, IChTj and Biopolimex Sp. z o. o. submitted an application to the ERAMIN3 program, which was positively assessed. In May 2022, we started the project "Phosphogypsum Processing to Critical Raw Materials" PG2CRM. of the project "Recovery of critical raw materials from phosphogypsum" is the development of an innovative process of REE recovery from phosphogypsum and the use of the remaining gypsum matrix as an inexpensive building material. The international consortium also includes the German company ALFERROCK GmbH, with which it also cooperates in the project.

In 2019-2020, I was a member of the team working on the report entitled "Preparation of a design for the construction of an experimental radioactive waste incineration installation" (consortium of ZUOP - Radioactive Waste Management Plant - State Enterprise, ICHTJ - Institute of Nuclear Chemistry and Technology, IChPW - Institute for Chemical Processing of Coal).

3. Obtaining the right of industrial property, including the national or international patents granted

National patent:

G. Zakrzewska-Kołtuniewicz, K. Kiegiel, A. Abramowska, D.K. Gajda; W. Łada, Instytut Chemii i Techniki Jądrowej, *Sposób wytwarzania oktatlenku triuranu z roztworów o niskiej zawartości uranu, (Method for producing ammonium diuranate from the solutions with low uranium content)* Polish Patent **236018**, Patent Office News, 19/2020, Patent Office of the Republic of Poland, November 30, 2020.

4. Information on implemented technologies- not applicable

5. Information on performed expert analyses or other studies prepared on request of public institutions or entrepreneurs

1. G. Zakrzewska-Kołtuniewicz, K. Kiegiel, A. Miśkiewicz, S. Sommer, O. Roubinek, D. Gajda, A. Abramowska, P. Kalbarczyk, I. Bartosiewicz, *Niekonwencjonalne źródła uranu w Polsce* (Unconventional sources of uranium in Poland), Expert opinion prepared under contract no. IV/758/P/15004/43902/DEJ, Warsaw 2015. Analysis commissioned by DEJ, Ministry of Economy

2. A. Bojanowska, M. Brykała, D. Chmielewska-Śmietanko, L. Fuks, D. Gajda, P. Kalbarczyk, I. Herdzik-Koniecko, **K. Kiegiel**, A. Miśkiewicz, J. Narbutt, H. Polkowska-Motrenko, M. Siwek, W. Starosta, T. Smoliński, K. Skotnicki, S. Sommer, D. Wawszczak, G. Zakrzewska-Kołtuniewicz, D. Miernicka, M. Banach, A. Grzegrzółka, G. Kuciel, M. Kwaśniewski, *Postępowanie z odpadami promieniotwórczymi i wypalonym paliwem jądrowym w Polsce – stan obecny i perspektywy (Management of radioactive waste and spent nuclear fuel in Poland - current status and prospects)*, opinion prepared under contract no. 156/II/P/15004/4390/17/DEJ as. " Analysis - management of radioactive waste and spent nuclear fuel in Poland - current status and prospects", Warsaw, December 2017, Analysis commissioned by DEJ, Ministry of Economy.

6. Information on participation in expert and competition teams - not applicable.

7. Information on artistic projects realized in non-artistic environment - not applicable

IV. SCIENTOMETRIC INFORMATION

1. Information on the Impact Factor (in the fields and disciplines in which this parameter is commonly used as a scientometric index)

The articles published after the award the PhD degree

Summary IF: **42.676/83.51**

The articles published prior to the award the PhD degree

Summary IF: **0/2.164**

2. Information on the number of citations of the applicant's publications, including a separate list of self-citations.

The articles published after the award the PhD degree:

Total number of citations numer/without self-citations: **316/289^{a)}**

The articles published prior to the award the PhD degree:

Total number of citations numer/without self-citations: **22/20^{a)}**

^{a)} Total number of citations based on the Scopus database/number without self-citations

The direct number of citations without self-citations, unavailable for the database, was calculated indirectly (as of April 14, 2023)

3. Information on h-index held

H-index = **12**

4. Information on the number of the points awarded by the Ministry of Science and Higher Education

The articles published after the award the PhD degree

Summary MNiSW points_{publication year/2021} = **1226/1925**

The articles published prior to the award the PhD degree

Summary MNiSW points_{publication year/2021} = no data/**40**