



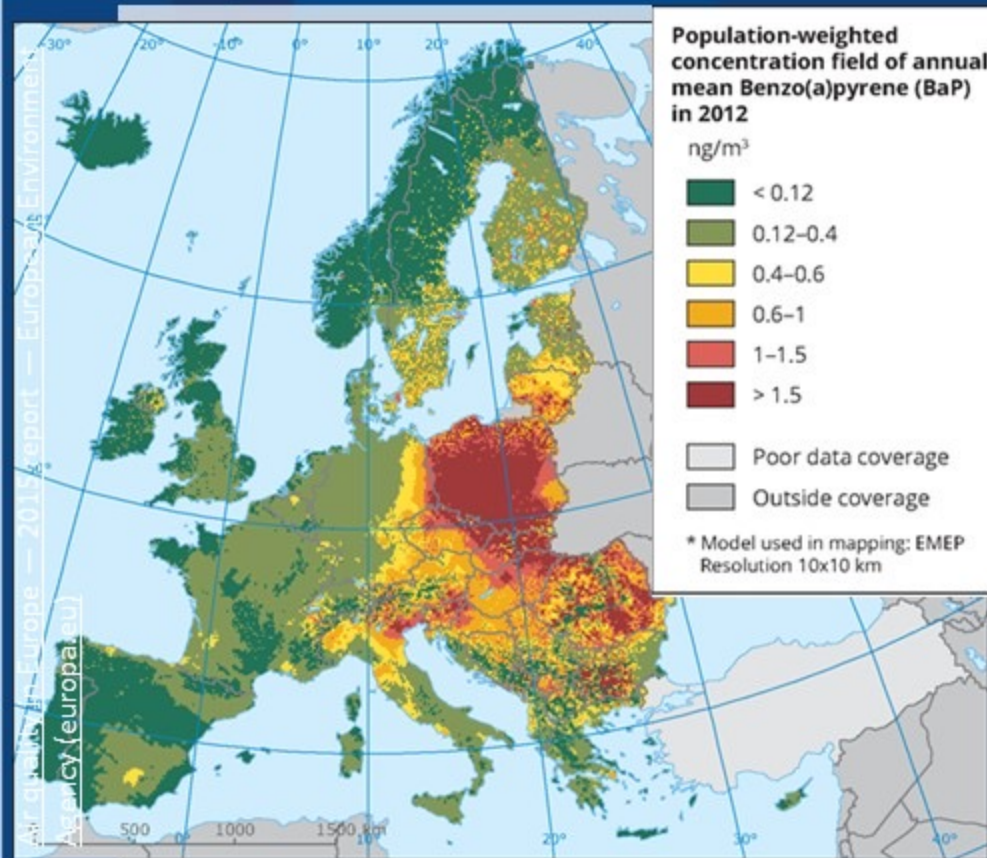
## **Microscopic constituents in solid residues from household combustion**

<sup>1</sup> Zbigniew Jelonek, <sup>1</sup> Iwona Jelonek, <sup>1</sup> Magdalena Misz-Kennan  
*<sup>1</sup> University of Silesia in Katowice*

71st Annual ICCP Meeting, Hague, the Netherlands, 15-21/09/2019



## Introduction: The quality of the air



- According to the report of the World Health Organization, "Ambient Air Pollution Database 2016", 33 out of the **50 most polluted cities** in the European Union are located in Poland.
- While the report of the World Health Organization in 2015 shows that air pollution in Poland contributed to **the deaths of 48 544** Poles in the year 2010, which in turn generated costs in the amount of 101, 826 billion dollars.



## Introduction: The motivation for the studies...

One concern entrepreneur and one amazing scientist, who decided to start their cooperation using a special Ph.D. studies program found by Polish Ministry of Science and Higher Education which leads not only to doctoral degree obtainment but also to the implementation of a new product for the domestic market.

Google | Homepage: Biome... | Forest Bioenergy Revie... | European Pellet Conference | Niebezpieczne związki w pali... | +

www.us.edu.pl/node/695433

Uniwersytet Śląski w Katowicach

STUDENT | KANDYDAT | BIZNES | ABSOLWENT | DOKTORANT | PRACOWNIK

**Niebezpieczne związki w paliwach stałych do grilla. Badania mgr. Zbigniewa Jelonka**

**Dzień Grilla**

Fragmety tworzyw sztucznych i metali, okruchy szkła, a nawet bursztynu – to przykładowe zanieczyszczenia, które mgr Zbigniew Jelonka, doktorant z Uniwersytetu Śląskiego, znalazł w próbkach węgla drzewnego i brykietu z węgla drzewnego – popularnych paliwach do grilla. Obecność tego typu substancji jest szczególnie niepożądana m.in. ze względu na związki muta- i kancerogenne, które powstają w wyniku spalania i osiadają na grillowanej żywności, a następnie, wraz z nią, dostają się do organizmu człowieka.

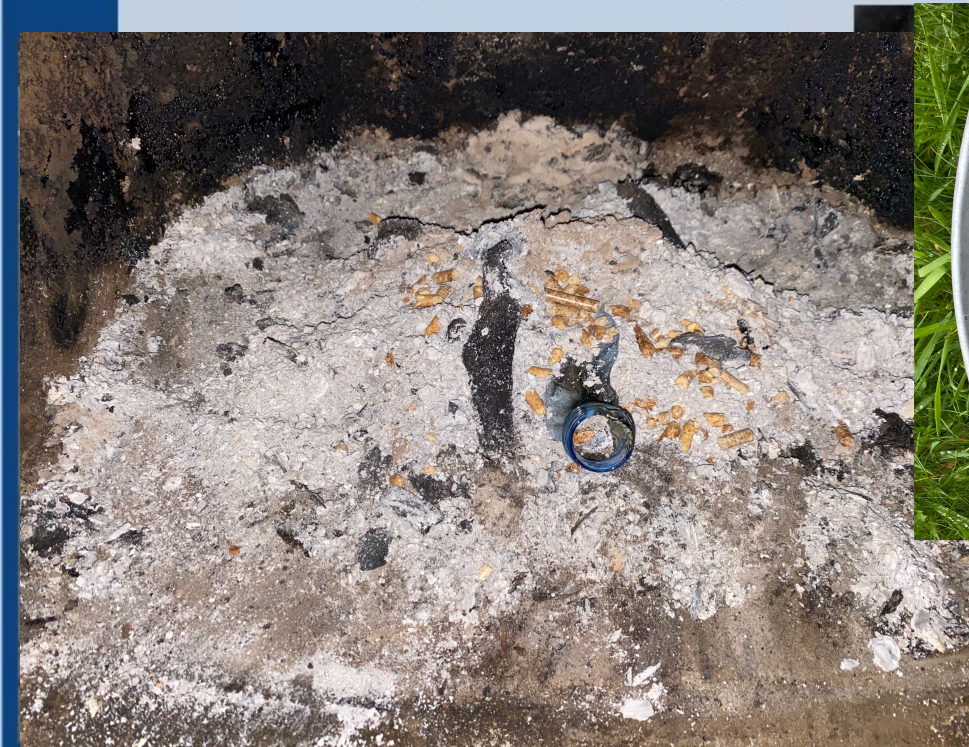


Prof. dr hab. Monika Fabiańska



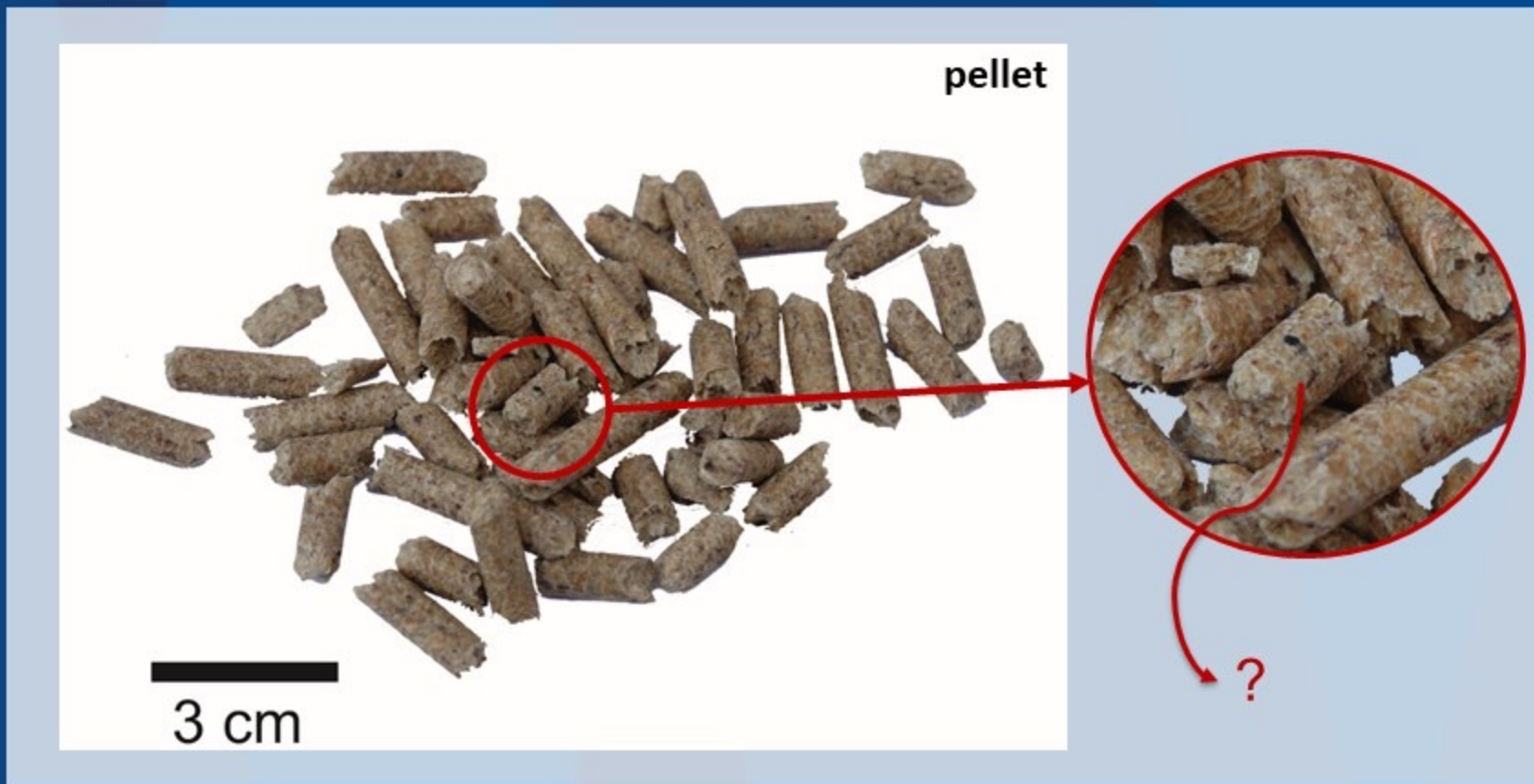
## Introduction: The motivation for the studies...

Determining optically recognizable characteristic residues in ashes from unwanted additives burned with dedicated fuels will complete and simplify these analyzes. This will also allow the identification of components that were previously impossible or very difficult to detect.



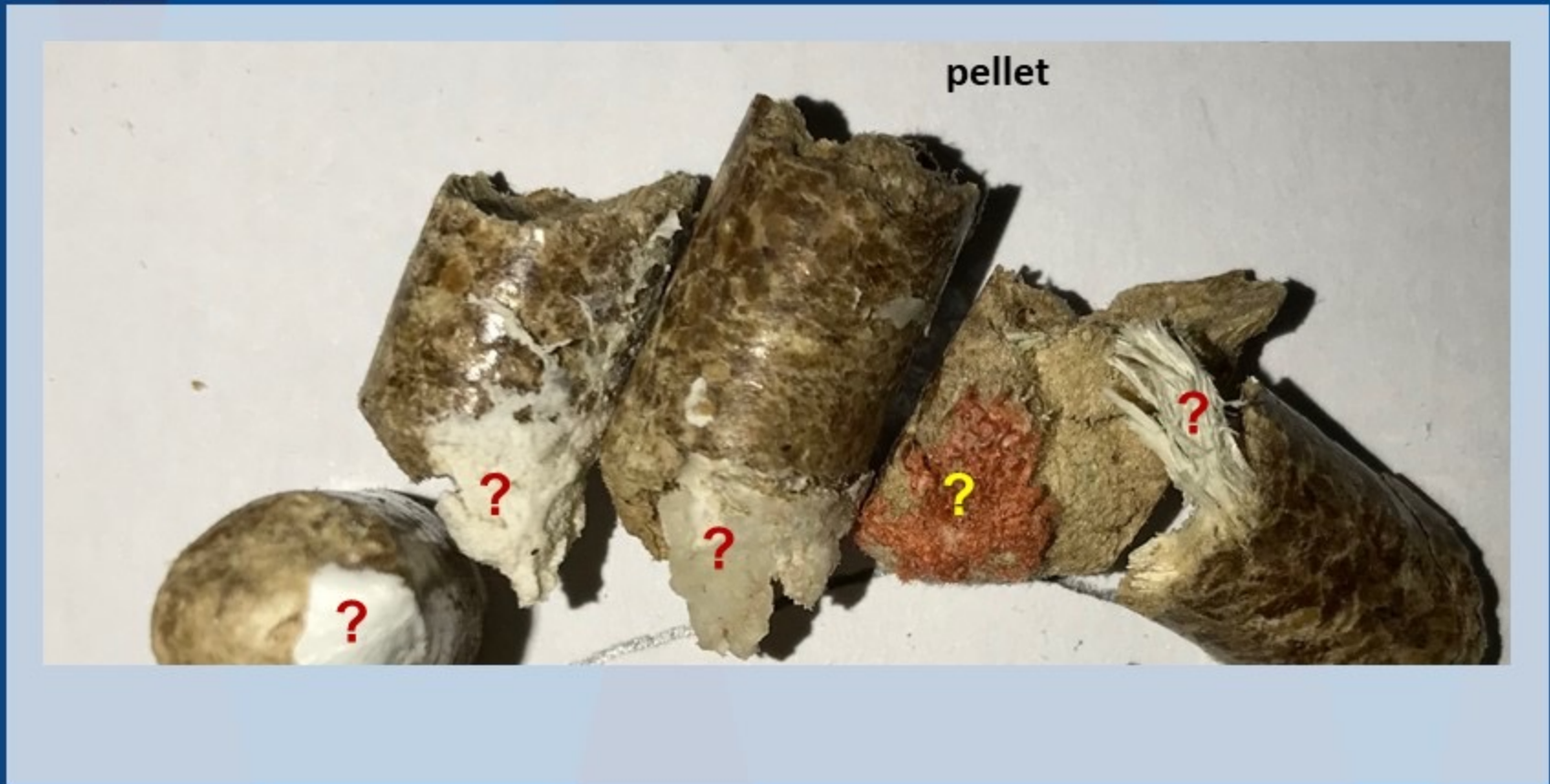


## Introduction: The motivation for the studies...



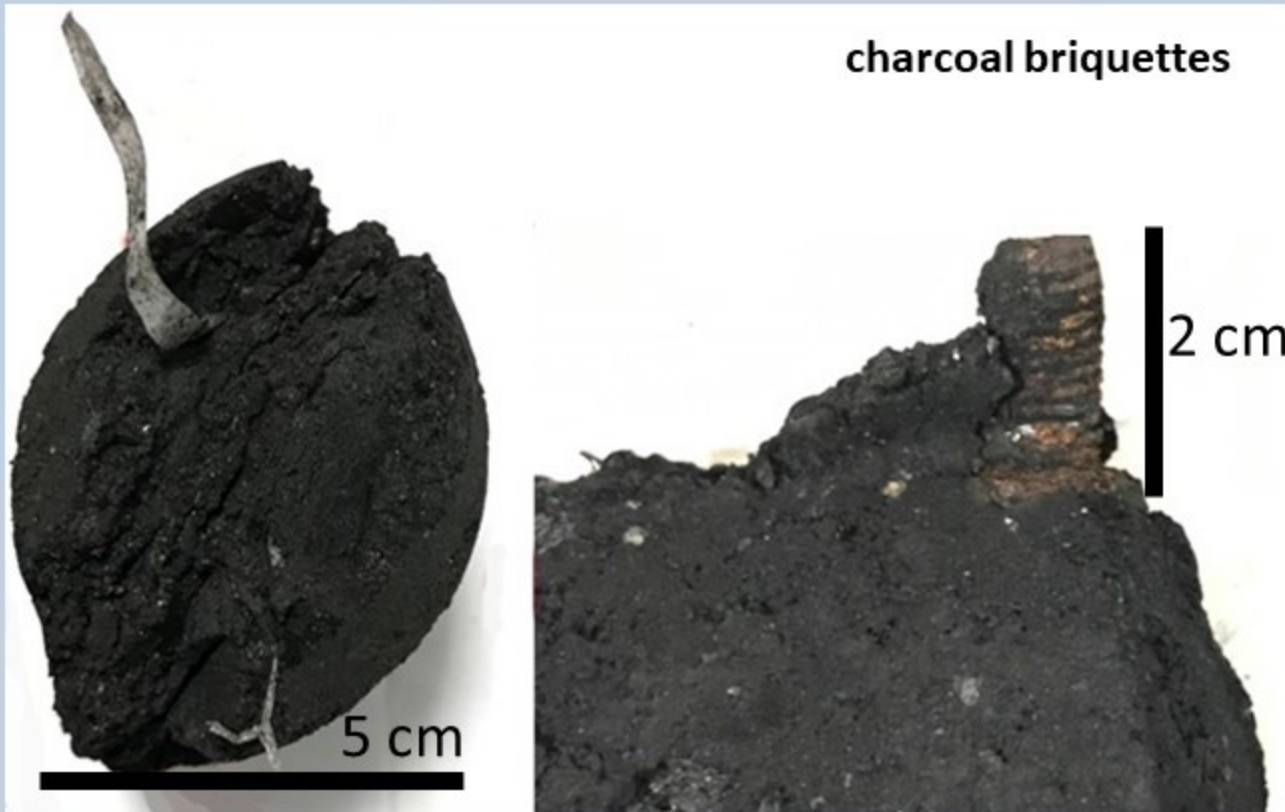


## Introduction: The motivation for the studies...





## Introduction: The motivation for the studies...





# Introduction: The motivation for the studies...

INDIANA GEOLOGICAL & WATER SURVEY  
ISSN 2642-1550, Volume 3, 2021

INDIANA JOURNAL OF EARTH SCIENCES

## ATLAS OF CHARCOAL-BASED GRILLING FUEL COMPONENTS

Agnieszka Drobnia<sup>1</sup>, Zbigniew Jelonek<sup>2</sup>, Maria Mastalerz<sup>1</sup>, Iwona Jelonek<sup>2</sup>

<sup>1</sup> Indiana Geological and Water Survey, Indiana University, 1001 E. 10th St., Bloomington, IN, 47405, USA  
<sup>2</sup> University of Silesia in Katowice, Institute of Earth Sciences, ul. Będzińska 60, 41-200 Sosnowiec, Poland

E-mail: agdrobni@indiana.edu  
Received 05/12/2021  
Accepted for publication 07/12/2021  
Published 07/13/2021



Suggested citation: Drobnia, A., Jelonek, Z., Mastalerz, M., Jelonek, I., 2021. Atlas of Charcoal-Based Grilling Fuel Components: Indiana Geological and Water Survey, Indiana Journal of Earth Sciences, v. 3. DOI 10.14434/ijes.v3i1.32559.

*Editor's Note:* This manuscript links to an online atlas stored on Resource Space at the IGWS:

[Click here to visit the atlas](#)

INDIANA GEOLOGICAL & WATER SURVEY  
ISSN 2642-1550, Volume 3, 2021

INDIANA JOURNAL OF EARTH SCIENCES

## ATLAS OF WOOD PELLET COMPONENTS

Agnieszka Drobnia<sup>1</sup>, Zbigniew Jelonek<sup>2</sup>, Maria Mastalerz<sup>1</sup>, Iwona Jelonek<sup>2</sup>

<sup>1</sup> Indiana Geological and Water Survey, Indiana University, 1001 E. 10th St., Bloomington, IN, 47405, USA  
<sup>2</sup> University of Silesia in Katowice, Institute of Earth Sciences, ul. Będzińska 60, 41-200 Sosnowiec, Poland

E-mail: agdrobni@indiana.edu  
Received 02/03/2021  
Accepted for publication 03/29/2021  
Published 04/19/2021



Suggested citation: Drobnia, A., Jelonek, Z., Mastalerz, M., Jelonek, I., 2021. Atlas of Wood Pellet Components: Indiana Geological and Water Survey, Indiana Journal of Earth Sciences, v. 3. DOI 10.14434/ijes.v3i1.31905.

*Editor's Note:* This manuscript links to an online atlas of wood-pellet photomicrographs stored on Resource Space at the IGWS:

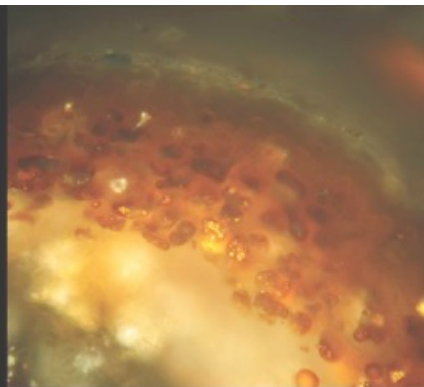
<http://go.iu.edu/woodpelletatlas>

## Iwona & Zbigniew Jelonek *Catalogue of images*

for comparative identification of solid  
impurities in charcoal and charcoal briquettes  
(solid fuels from biomass) using optical microscopy

Iwona Jelonek jest pracowniczką naukową w Uniwersytecie Śląskim w Katowicach na Wydziale Nauk o Ziemi. Lata spędziła specjalizując się w dziedzinie Petrologii Organicznej Węgla i produktach węglowych. Zbigniew Jelonek ma inne studia i stopień doktorskie nadrobione zdalnie na Wydziale Nauk o Ziemi Uniwersytetu Śląskiego w Katowicach. Kariera Feliksa jest asenstnikiem: studiów doktoranckich oraz pracuje na stanowisku technicznym w Uniwersytecie Śląskim w Katowicach na Wydziale Informatyki i Nauki o Materiałach w Instytucie Technologii i Mechaniki.

Opracowanie, które odbijemy Wam drodzy czytelnicy do ręki może posłużyć jako przewodnik do orientacji, rozpoznawania oraz zliczania możliwych składów mikroskopowej zawiesiny pyłu w węglach paleniskowych grillowych. Poważną funkcją praktyczną katalogu zdjęć sławo-ajęć, próg węglowej gęstości analizatorów niewielkiego pyłku mikrocząsteczkowej może zainteresować pozostałych odbiorców nie związanych z branżą. Na prezentowanych rysunkach rozpoznawalne obiekty występujące w węglu drzewnym i brykietach z węglu drzewnego poza innymi są za sobą zapakowane dla łatwego zorientowania zachowy. Odnosić fascynujące barwy i struktury w jakiej mogą występować typowe składniki paleniskowych, z których obciążamy na co dzień w postaci makrocząstek. Uwaga: Zdjęcia mają formaty kolor (lub albo czarno-białe).  
ISBN 978-83-8155-888-4



© Iwona Jelonek, 2019  
© Zbigniew Jelonek, 2019  
ISBN 978-83-8155-888-4



Ridero  
Przedruk w celu  
promocyjnym

<https://data.igws.indiana.edu/page/search.php?k=ce4dcd7d5&sea&ch=%21collection175>

<https://data.igws.indiana.edu/page/search.php?k=ce4dcd7d5&sea&ch=%21collection144>





## **Objectives of the exercise for ashes obtained from household furnaces. Working Group:**

The purpose of the exercise is to optically identify the quality and quantity of components found in ashes obtained from household furnaces. Optical examination of ashes obtained from boilers and furnaces combined with their physical and chemical analysis will allow determining the quality of fuels used in domestic furnaces after their combustion. This will also allow identifying and eliminating contaminated fuels produced from biomass and used in household furnaces.



## Selection of the sample and preparation:





## Selection of the sample and preparation:



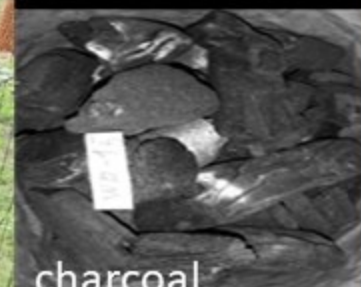
WD.20

charcoal



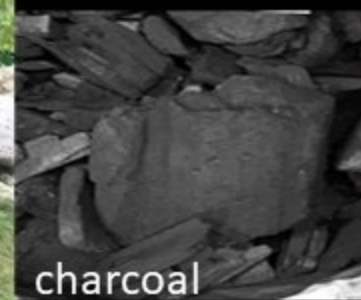
WD.18

charcoal



WD.15

charcoal



WD.11

charcoal

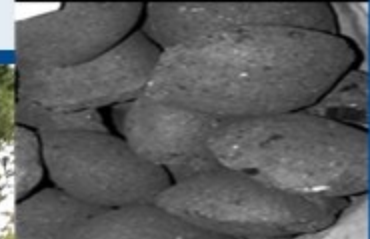


# Selection of the sample and preparation:



B-28

charcoal briquettes



B-20

charcoal briquettes



B-15

charcoal briquettes



B-13

charcoal briquettes



## Selection of the sample and preparation:



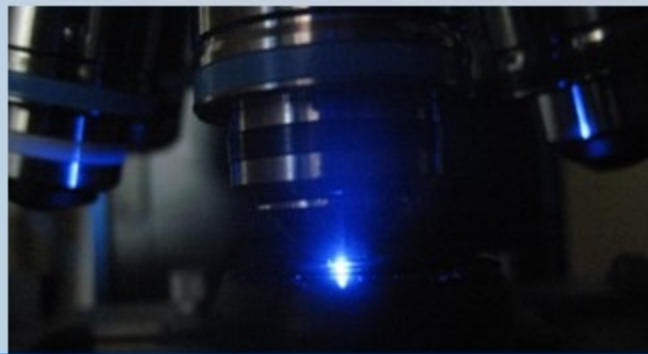
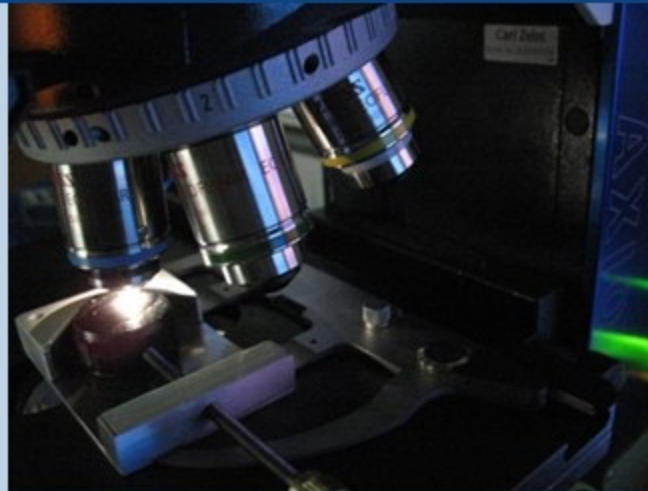
charcoal

charcoal briquettes

pellets



## Instructions – how to perform the exercise:

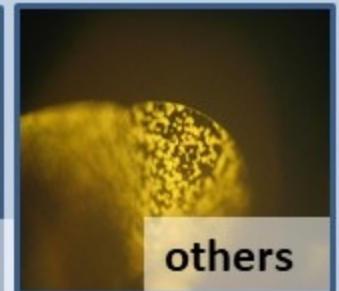
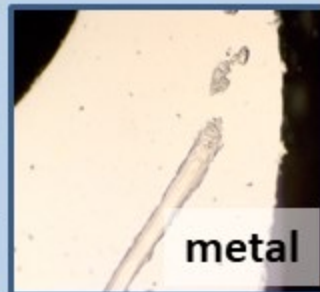




## Instructions – how to perform the exercise:

**There are following particles:**

rust, metal, plastic, slag, glass, petroleum products, mineral matter, coal, biomass, bark, coke, and others





## In summary – how to perform the exercise:

- ✓ Three sets were prepared for the exercise. Each participant of the exercise will receive:
  - photos made of ashes obtained from pellet combustion
  - photos made of ashes obtained from charcoal combustion
  - photos made of ashes obtained from charcoal briquettes combustion
  - "Catalog of photos for comparative identification of solid impurities found in charcoal and charcoal briquettes by optical microscopy,"

The exercise consists of:

1. Identification of individual elements indicated by an arrow in individual photos (1-20) for each set separately.
2. Entering the results (example \*) in the appropriate columns (reply.xlsx file) for each sheet set for Excel 1. (Pellet), Excel 2. (Charcoal), Excel 3. (Briquette)

- ✓ All participant are also welcome to add their comments to this exercise.
- ✓ The total time needed for performing the exercise is of about 2 hours, so we hope to receive your response before **10 September 2021 (deadline)**.





Thank you for your attention

Any further questions? Please direct them to:



Dr Zbigniew Jelonek  
e-mail: [zjelonek@us.edu.pl](mailto:zjelonek@us.edu.pl)



Dr hab. Iwona Jelonek, MBA  
e-mail: [iwona.jelonek@us.edu.pl](mailto:iwona.jelonek@us.edu.pl)



Dr hab. Magdalena Misz-Kennan  
e-mail: [magdalena.misz@us.edu.pl](mailto:magdalena.misz@us.edu.pl)