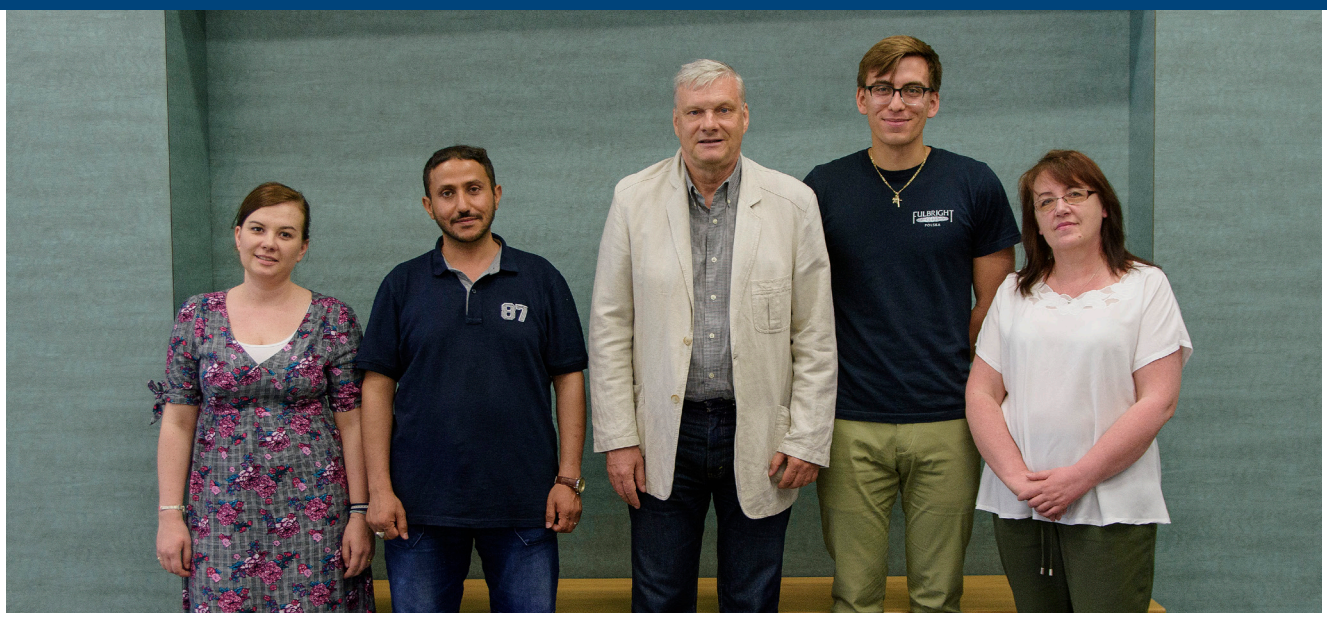
Laboratory of Radiochemistry and Atmospheric Chemistry



HEAD:

Prof. Tomasz Gierczak*, PhD DSc

GROUP MEMBERS:

Anna Makowska, PhD; Bartłomiej Witkowski, PhD
PhD students: Mohammed Al-sharafi,
Monika Ganeczko

RESEARCH PROFILE:

- Analytical methods development for the determination of organic compounds in complex matrices using capillary gas chromatography coupled with mass spectrometry (GC/MS) and high-performance liquid chromatography coupled with tandem mass spectrometry HPLC/MS /MS.
- Investigation of the chemical processes taking place in the atmosphere; studying the mechanism of formation and transformation of secondary organic aerosols (SOAs) in the troposphere; investigation of kinetics and mechanism of organic compounds oxidation in atmospheric water.
- Analysis of organic compounds in archaeological samples of high historical value.

CURRENT RESEARCH ACTIVITIES:

At the moment, we are conducting a study of the composition of organic aerosol (SOA) resulting from the ozonolysis reaction of sesquiterpenes. Ozone reacts with β-caryophyllene in the gas phase in a flow reactor, without the presence of a scavenger. The resulting oxidized products condensed in the form of an aerosol. The aerosol is collected on the filter and the filter extract is analyzed by HPLC/MS/MS. A number of ozonolysis products have been identified and pathways of their formation have been proposed.

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SELECTED PUBLICATIONS:

1. B. Witkowski, A. Duchnowicz, M. Ganeczko, A. Laudy, T. Gierczak, M. Biesaga, Identification of proteins, drying oils, waxes and resins in the works of art micro-samples by chromatographic and mass spectrometric techniques, Journal of Separation Science. 41(3) (2018) 630-638.
2. B. Witkowski, S. Jurdana, T. Gierczak, Limononic acid oxidation by hydroxyl radicals and ozone in the aqueous phase, Environ. Sci. Technol. 52(6) (2018) 3402-3411.
3. B. Witkowski, M. Ganeczko, H. Hryszko, M. Stachurska, T. Gierczak, M. Biesaga, Identification of orcein and selected natural dyes in 14th and 15th century liturgical paraments with high-performance liquid chromatography coupled to the electrospray ionization tandem mass spectrometry (HPLC-ESI/MS/MS), Microchemical Journal. 133 (2017) 370-379.
4. B. Witkowski, T. Gierczak, Characterization of the limonene oxidation products with liquid chromatography coupled to the tandem mass spectrometry, Atmospheric Environment. 154 (2017) 297-307.