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## Characterization of PM<sub>10</sub> fraction before pandemic and during pandemic COVID-19 at the traffic station in Krakow, Poland

Lucyna Samek<sup>1</sup>, Anna Ryś<sup>1</sup>, Zdzisław Stęgowski<sup>1</sup>, and Katarzyna Styszko<sup>2</sup>

<sup>1</sup>Faculty of Physics and Applied Computer Science, AGH University of Science and Technology, Al. Mickiewicza 30, 30-059 Krakow, Poland (lucyna.samek@fis.agh.edu.pl)

<sup>2</sup>Faculty of Energy and Fuels, AGH University of Science and Technology, Al. Mickiewicza 30, 30-059 Krakow, Poland (styszko@agh.edu.pl)

Samples of PM<sub>10</sub> were collected at the traffic station in Krakow, Poland during two periods: 2<sup>nd</sup> February- 30<sup>th</sup> May 2018 and 2<sup>nd</sup> February 17<sup>th</sup> June 2020. PM<sub>10</sub> concentrations were determined gravimetrically. PM<sub>10</sub> concentrations dropped by 50% from 74±29 µg/m<sup>3</sup> to 37±13 µg/m<sup>3</sup> in 2018 and 2020, respectively. Elemental concentrations were determined by energy dispersive X-ray fluorescence method (EDXRF) and ion concentrations by ion chromatography (IC). 18 elements and 8 ions were measured. Ratios of concentrations in 2018 to 2020 were above 1.7 for the following elements: S, Cl, K, Zn, Br and ions SO<sub>4</sub><sup>2-</sup>, Na<sup>+</sup>, NH<sub>4</sub><sup>+</sup>. The above-mentioned ratio was equal to 1.4 for Cu, Fe and Co. Similar concentrations in 2018 and 2020 were observed for the following chemical species: Ca, Ti, Mn, Ni, Rb, Sr, K<sup>+</sup>, Mg<sup>2+</sup>, Ca<sup>2+</sup>, PO<sub>4</sub><sup>3-</sup>. Cr concentration was higher in 2020 compared to 2018. Four factors were obtained from PMF (Positive Matrix Factorization) modelling. The following sources were attributed: solid fuel combustion, secondary inorganic aerosols, traffic/industry/construction work and soil. The contribution of traffic/industry/construction work to PM<sub>10</sub> mass was the highest. It was equal to 24.6 µg/m<sup>3</sup> and 23.4 µg/m<sup>3</sup> in 2018 and 2020, respectively. The contribution of solid fuel combustion and secondary inorganic aerosols was five times lower in 2020 than in 2018. Contribution of solid fuel combustion was 14.5 µg/m<sup>3</sup> and 2.6 µg/m<sup>3</sup> in 2018 compared to 2020. SIA was lowering from 15.7 µg/m<sup>3</sup> in 2018 to 2.5 µg/m<sup>3</sup> in 2020. Traffic/industry/construction work and soil contribution was on the similar level in both years. Two factors affected characteristic of PM<sub>10</sub>: one was a ban of using coal and wood for heating purpose introduced in Krakow in September 2019 and second one was pandemic of COVID-19 started in March 2020. Our study will be helpful for the local authority in preparing future plans for reducing air pollution within the city.

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