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The anthropogenic magnetic particles contain in indoor dust as markers of pollution emitted by different outside sources.

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The aim of the study was to explain the impact of magnetic particles originated from different external sources of pollution on the air quality inside apartments. We used the indoor dust as an indicator of air pollution inside apartments. For the study, a small town was chosen, in which dominated the local sources of pollution: (1) vehicle traffic (in the city center), (2) local heating plant, (3) individual households (in the suburbs) and (4) re-emission of soil particles from the contaminated post-industrial area. In each of four areas were selected several private apartments as a sampling points. Dust samples were collected by the owners of apartments from the floor surface using vacuum cleaners in the same time period (September 2014).

The concentration-dependent magnetic parameters (magnetic susceptibility - and magnetization M_S) were used to determine the level of the magnetic pollution of the indoor dust. The properties of magnetic particles (mineralogy, domain structure and grain size), and their chemical composition were used to describe and identify the source of air pollution inside the apartments.

Generally, the results showed that in each of studied areas were observed flats with both: very high and low values of parameters depending on the concentration of magnetic particles. The biggest differences between the areas were visible in mineralogy of magnetic fraction of pollution.

The research of apartments exposed to pollution generated by vehicle traffic (located in the city center) show a wide range of values χ (75-1021 $\cdot 10^{-8}$ m^3kg^{-1}) and M_S (35-656 $\cdot 10^{-3}$ Am^2kg^{-1}).

These differences were due to the high contribution of pure iron to magnetic fraction of pollution. Detailed analysis of the M (T) curves revealed two magnetic transitions: first at a temperature T_c = 585^{o}C for magnetite and the second at T_c = 760^{o}C for pure iron. For the dust samples from the city center the high values of χ and M_S well correlated with high level of anthropogenic elements Ni, Zn, Fe, Mn, Cr, Co, which main source is the motor vehicle traffic.

Samples of dust collected from the apartments located near the urban heat contained magnetite and pure iron, but in smaller amounts than the samples from the city center. The dust coming from the apartments located on contaminated post-industrial area contains only magnetite. On the curves χ(T), the contribution of the pure iron was not visible. For the both groups of the samples, the concentration expressed by the magnetic susceptibility correlated with a high concentration of heavy metals and toxic elements.

Dust samples from the apartments located in the area with low anthropogenic factor (in the suburbs) had the values of χ and M_S below average values determined from all investigated areas. Generally, the magnetic fraction of dust mainly contained fine grained magnetite but also small amount of pure iron. The contribution of pure iron depends on proximity of the apartment to the road. In this group, the relatively low susceptibility values of correlated with the low concentration of heavy metals.