

[Quantification of tire wear particles in road dust from industrial and residential areas in Seoul, Korea](#)

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Abstract:

In this study, we examined tire and road wear microparticles (TRWMPs) in road dust along the Seoul metropolitan area, from industrial and residential areas. The road dust samples were collected via vacuum sweep methods and then filtered to obtain particles with diameters less than 75 μm . To quantify the TRWMPs in road dust, we used the raw materials of tire components, natural rubber (NR), and styrene–butadiene rubber (SBR), as standard materials. We evaluated the usability of the pyrolyzer-gas chromatography/mass spectrometry py-GC/MS method introduced in ISO/TS 20593 by confirming the decomposition temperatures of the NR and SBR by thermogravimetric (TG) and evolved gas analysis (EGA)-MS. The average of TRWMPs in industrial and residential area road dust were 22,581 and 9818 $\mu\text{g/g}$, respectively, indicating that the industrial area has 2.5 times higher TRWMPs concentration. Further, the NR, the main component of truck bus radial, to SBR, the main component of passenger car radial, ratio was slightly higher in the industrial area than in the residential area. This presumably means that the high traffic volume, including heavy duty vehicles in industrial areas, affected the higher concentration of TRWMPs. This study reveals the growing evidence of the importance of TRWMPs in road dust and how TRWMPs quantity can impact the air quality of the Seoul metropolitan area.

* Excerpted from online journal website (Click the title)

Frontier Labs Products used:

Multi-Shot Pyrolyzer (EGA/PY-303D)