

Indoor and Outdoor Concentration of PM₁₀, PM_{2.5} and PM₁ in Residential Building and Evaluation of Negative Air Ions (NAIs) in Indoor PM Removal

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Abstract : Indoor and outdoor particulate matters (PM) were monitored in 20 residential buildings in a two-part study. In part I, the levels of indoor and outdoor PM₁₀, PM_{2.5} and PM₁ was measured using real time GRIMM dust monitors. In part II, the effect of negative air ions (NAIs) method was investigated on the reduction of indoor concentration of PM in these residential buildings. Hourly average concentration and standard deviation (SD) of PM₁₀ in indoor and outdoor at residential buildings were 90.1 ± 33.5 and 63.5 ± 27.4 $\mu\text{g}/\text{m}^3$, respectively. Indoor and outdoor concentrations of PM_{2.5} in residential buildings were 49.5 ± 18.2 and 39.4 ± 18.1 $\mu\text{g}/\text{m}^3$ and for PM₁ the concentrations were 6.5 ± 10.1 and 4.3 ± 7.7 $\mu\text{g}/\text{m}^3$, respectively. Indoor/outdoor (I/O) ratios and concentrations of all size fractions of PM were strongly correlated with wind speed and temperature whereas a good relationship was not observed between humidity and I/O ratios of PM. We estimated that nearly 71.47 % of PM₁₀, 79.86 % of PM_{2.5} and of 61.25 % of PM₁ in indoor of residential buildings can be removed by negative air ions.

Keywords : particle matter (PM), indoor air, negative air ions (NAIs), residential building

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