



# Know Your Air Pollutants



UrbanEmissions (UEinfo) was founded in 2007 with the vision to be a repository of information, research, and analysis related to air pollution.

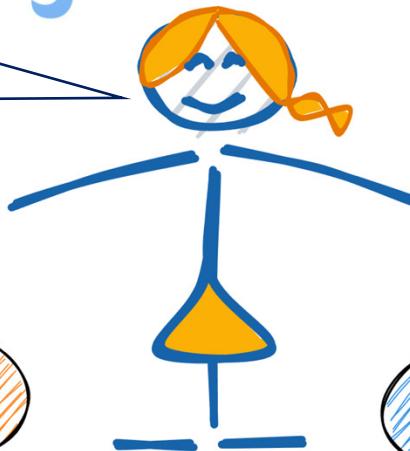
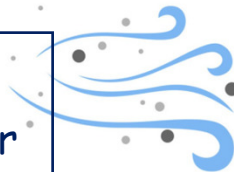
Pollutant characters designed by Siddhant and Saachi (2023).

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Send your questions and comments to [simair@urbanemissions.info](mailto:simair@urbanemissions.info)



Anything burning eventually ends up as air pollution. Let's get to know the air pollutants



particulate matter



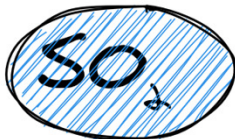
particulate matter



nitric oxide



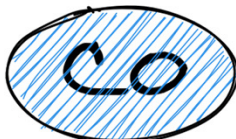
poly-aromatic hydrocarbons



sulphur dioxide



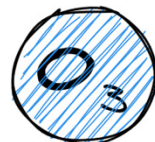
nitrogen dioxide



carbon monoxide



ammonia



ozone



I am particulate matter, in short PM.

I have other names - aerosol, soot, and dust

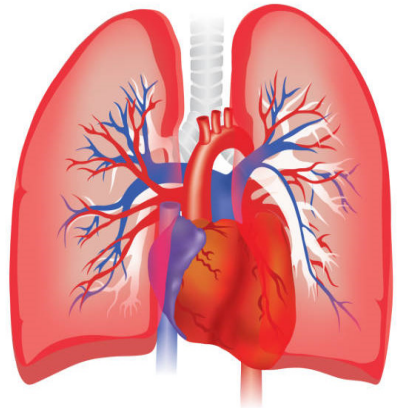
I come in two common sizes

$PM_{2.5}$  = all PM with diameter under  $2.5\ \mu m$

$PM_{10}$  = all PM with diameter under  $10.0\ \mu m$

I also come in finer sizes, but not measured for regulatory purposes.

I am small enough to enter the lungs, heart, and blood, and known to cause pre-mature death and morbidity with health effects ranging from - Alzheimer (dementia), Anxiety, Asthma cases & attacks, Blood pressure, Chronic lung diseases (COPD), Development damage, Diabetes (sugar), Heart attacks, Inflammation, Low infant birthweight, Lung cancer, Pneumonia, Reproduction disorders, Shortness of breath, Strokes, and Wheezing & coughing.





I am Sulphur Dioxide, in short  $\text{SO}_2$ .

I exist in gas phase.

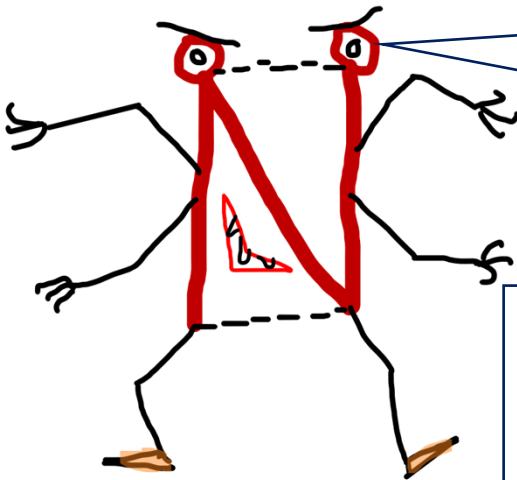
After participating in a series of chemical reactions with other pollutants, my composition and size shifts to aerosol phase called "sulphates" and get attached to  $\text{PM}_{2.5}$ .

In short bursts, I can harm the human respiratory system and make breathing difficult. People with asthma, particularly children, are more sensitive.

In the aerosol phase, I can do what PM can do.

I am the main ingredient of acid rain.





I am Nitrogen Dioxide, in short NO<sub>2</sub> and have a cousin called Nitric Oxide (NO).

I exist in gas phase.

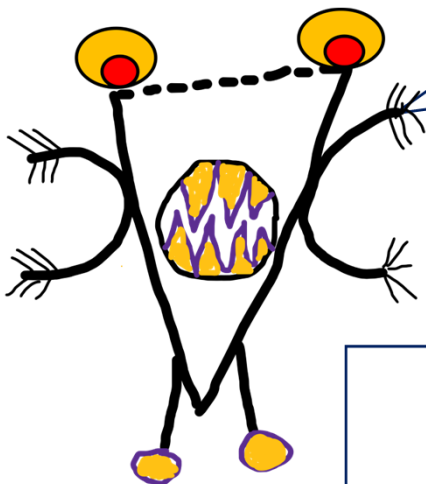
After participating in a series of chemical reactions with other pollutants, my composition and size shifts to aerosol phase called "nitrates" and also get attached to PM<sub>2.5</sub>.

In short bursts, I can irritate and aggravate respiratory diseases, particularly asthma, leading to respiratory symptoms (such as coughing, wheezing or difficulty breathing). People with asthma, particularly children, are more sensitive.

In the aerosol phase, I can do what PM can do.

I am also part of the acidification and eutrophication problems.





I am Volatile Organic Compounds, in short VOC. I come in many shapes, sizes, and compositions and some common names are benzene, xylene, toluene, formaldehyde, and many forms of alkanes, alkenes, acids, alcohols, etc.

I exist in gas phase.

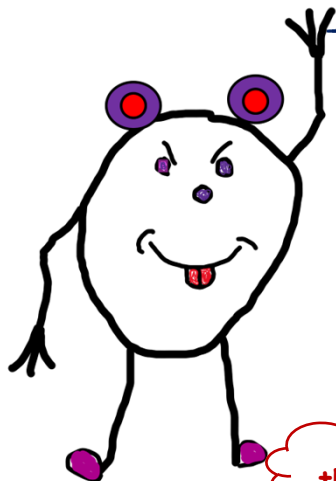
After participating in a series of chemical reactions with other pollutants, my composition and size shifts to aerosol phase called "secondary organic aerosols" and also get attached to  $PM_{2.5}$ .

I help  $NO_2$  and  $NO$ , to form or destruct ozone in the presence of sunlight. I help in the oxidation of many chemical species.

Yay !!!



My dancing partner !!!

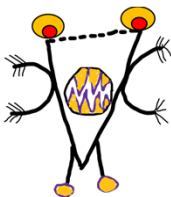
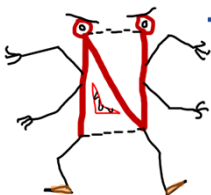


I am Ozone, in short  $O_3$ .

I exist in gas phase.

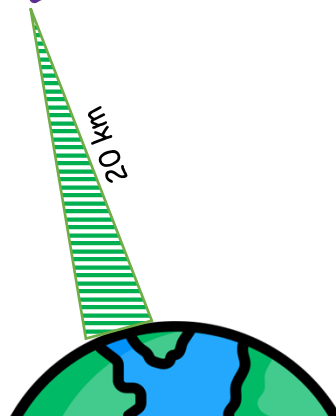
I come to being only after a series of chemical reactions between  $NO_2$ ,  $NO$ , and VOCs in the presence of sunlight. I help in the oxidation of many chemical species.

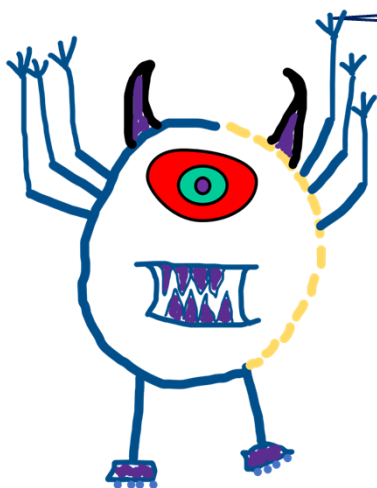
Hi  
there !!



Depending on the level of exposure, I can cause coughing, itchy throat, itchy eyes, breathing impairment, inflammation in the airways, and aggravate lung diseases such as asthma, emphysema, and chronic bronchitis, and eventually leading to premature mortality in case of vulnerable population.

Ozone is  
considered good in  
the stratosphere,  
protects us from  
UV rays

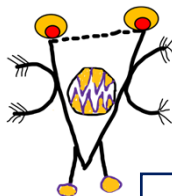
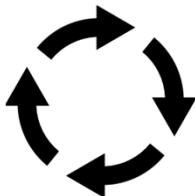




I am Carbon Monoxide, in short CO.

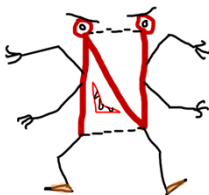
I exist in gas phase.

I am also an integral part of 100s of chemical reactions with NO, NO<sub>2</sub>, VOCs, and Ozone.



At low concentrations, I can cause fatigue and chest pain.

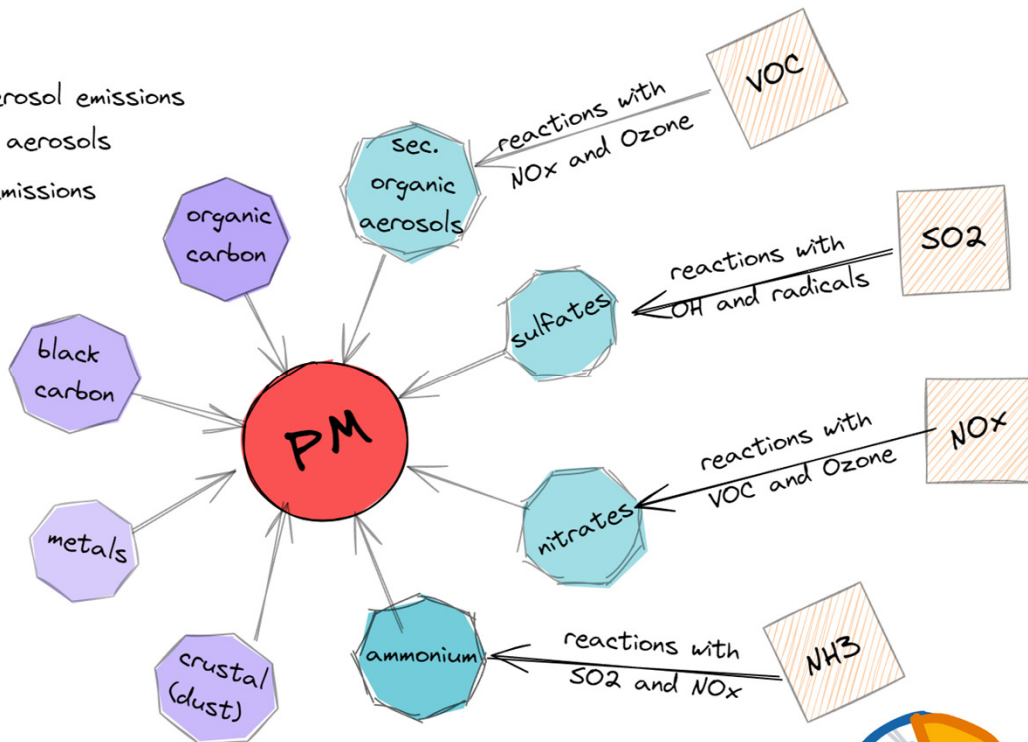
At higher concentrations, I can cause vision impairment; headaches; dizziness; confusion; and nausea.



And at very high concentrations, I form carboxyhemoglobin in the blood, which inhibits oxygen intake and lead to death.



- primary aerosol emissions
- secondary aerosols
- gaseous emissions

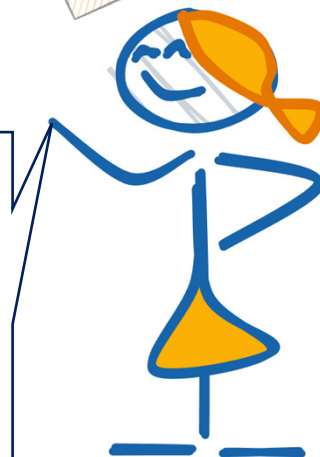


Is PM the most important pollutant to monitor for health effects?



Yes, in the low- and middle-income countries, PM is the most important pollutant. As you can see above, its chemical composition is a combination of both primary emissions and secondary chemical contributions.

In the US and EU,  $\text{NO}_2$  and Ozone are considered more important.







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