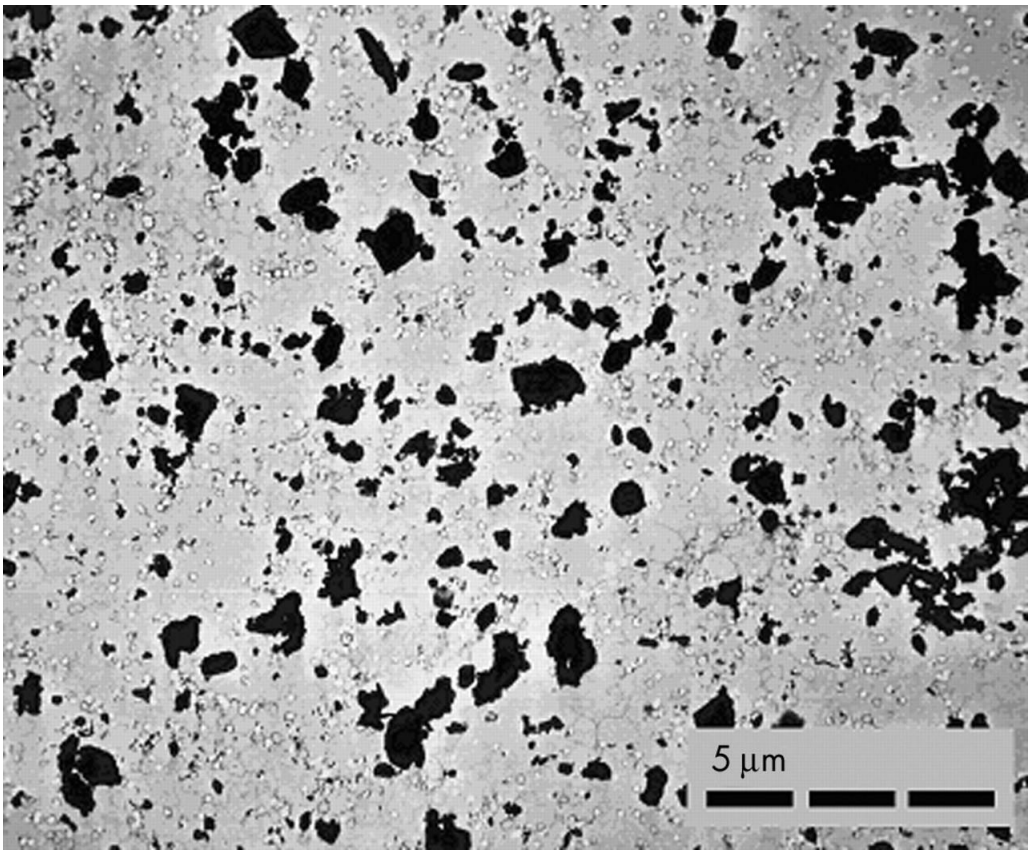
Air Pollution Laboratory

Theoretical part

Dust consists of particulate matter (PM) in the atmosphere. Its represents one of the most significant air pollutants that produces several damages on humans, animals and plants especially when it exists in a large quantity to cover large areas.

Dust particles come from various sources such as: soil, dust lifted by weather (an Aeolian process), volcanic eruptions, and pollution.

Dust in homes, offices, and other human environments contains small amounts of plant pollen, human and animal hairs, textile fibers, paper fibers, minerals from outdoor soil, human skin cells, and many other materials which may be found in the local environment.

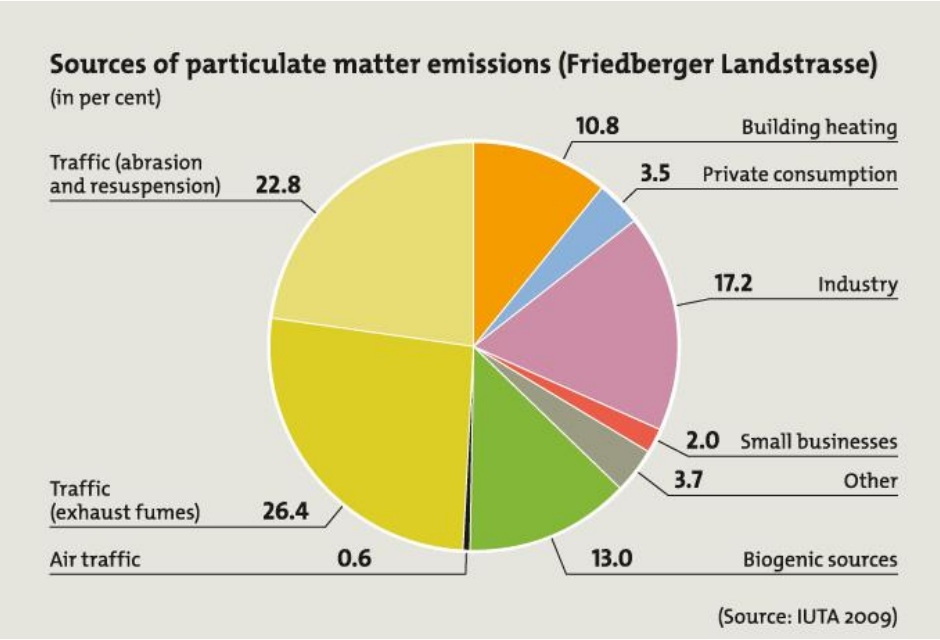


Size is important to the behavior of PM in the atmosphere and human body and determines the entry and absorption potential for particles in the lungs. Particles larger than 10 µm are trapped in the nose and throat and never reach the lungs. Therefore, particles 10 µm in diameter or less are of most concern for their effects on human health. Particles between 5 and 10 µm are removed by physical processes in the throat. Particles smaller than 5 µm reach the bronchial tubes, while particles 2.5 µm in diameter or smaller are breathed into the deepest port ions of the lungs.

Dust particles are classified according to its size to

1- **Accumulated dust particles**: its size is more than 12.5 µm and it has a slight effect on the respiratory tract because the nasal hairs are able to catch this type of particles, but it has a sever effect on eyes.

2- **Suspended dust particle:** its size range between (0.1-12.5 pm). It deposit slowly as they remain suspended in air for long time, and it has a dangerous effect on human and animals health and produce lung diseases.



Practical part:

Accumulated dust particles measurement

In this experiment, it must be taken in consideration that Accumulated dust particles must be measured during natural conditions and non- stormy rainy or weather, because rain works to wash air dust.

Opened glass method:

1. Weigh the empty glass (W_1).

2. Put (150 ml) of distilled water in the glass and leave it opened for one glass week in the outdoor environment.

3. After one week, heat the glass to let the rest amount of water to evaporate, then leaves the glass to get cold and weigh it to (W_2) give

4. Calculate the dust weight from the following:

Accumulated dust particle weight = W_2 - W_1

Suspended dust particle examination by using sticky surface

Suspended dust particle could be caught from air by a sticky surface when it falls down under the effect of gravity.

Sticky surface method

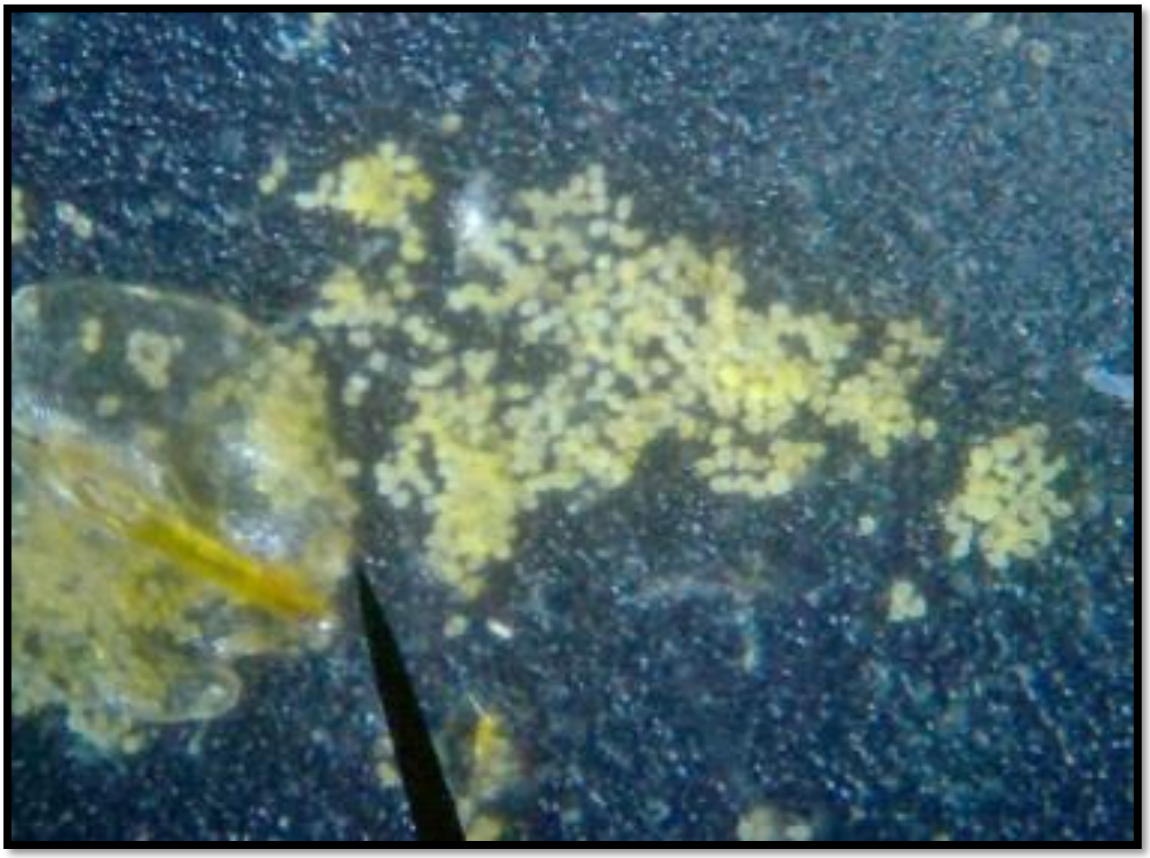
1. Put glycerin clean glass slide glycerin is a ratingeous material that on a laid horizontally on the slide and left for one week exposed to air.

2. Examine the slide under microscope to distinguish the deposited particles by using different powers of magnification. Shape and color of dust particles

could be recognized articles may include plant pollen, fibers carbon particles and dust particles.

3. Particle shapes could be arranged in the following table:

Type Of Suspended dust particle	NO.
Pollen	
Dust particles	
Carbon particles	
Fibers	



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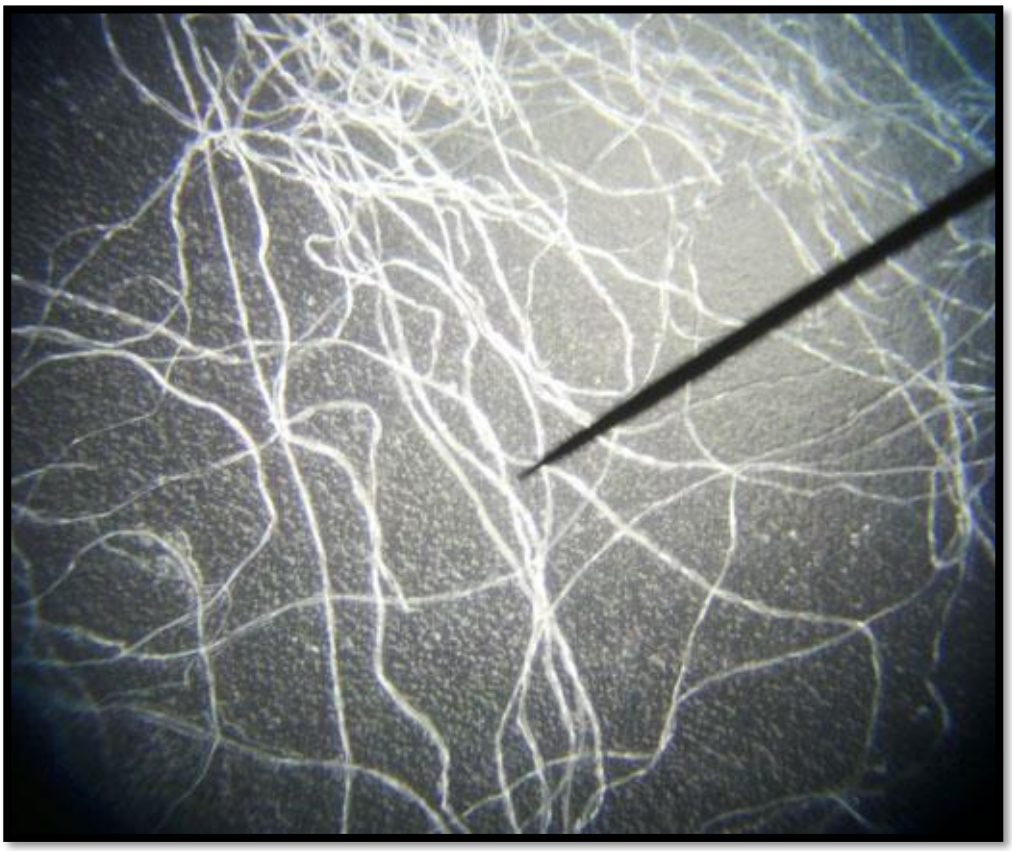

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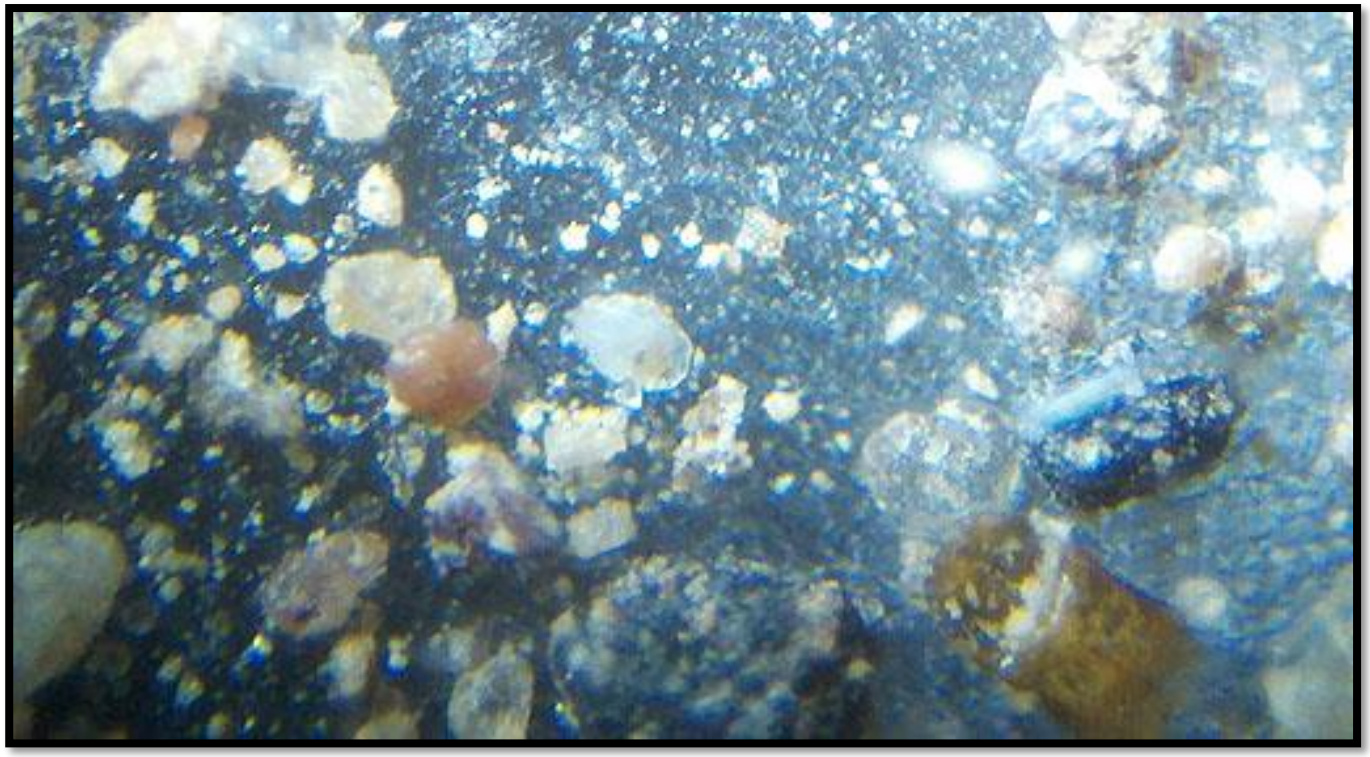

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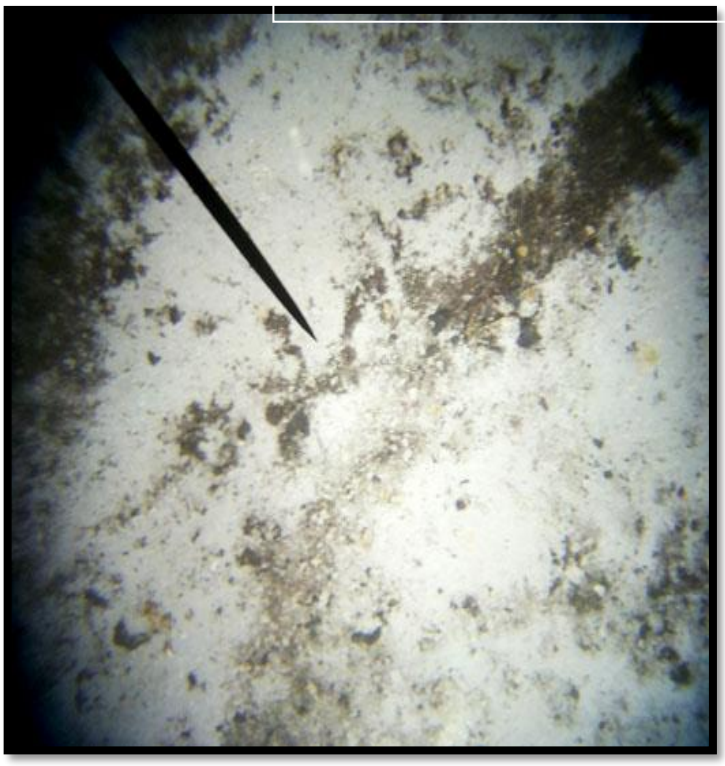

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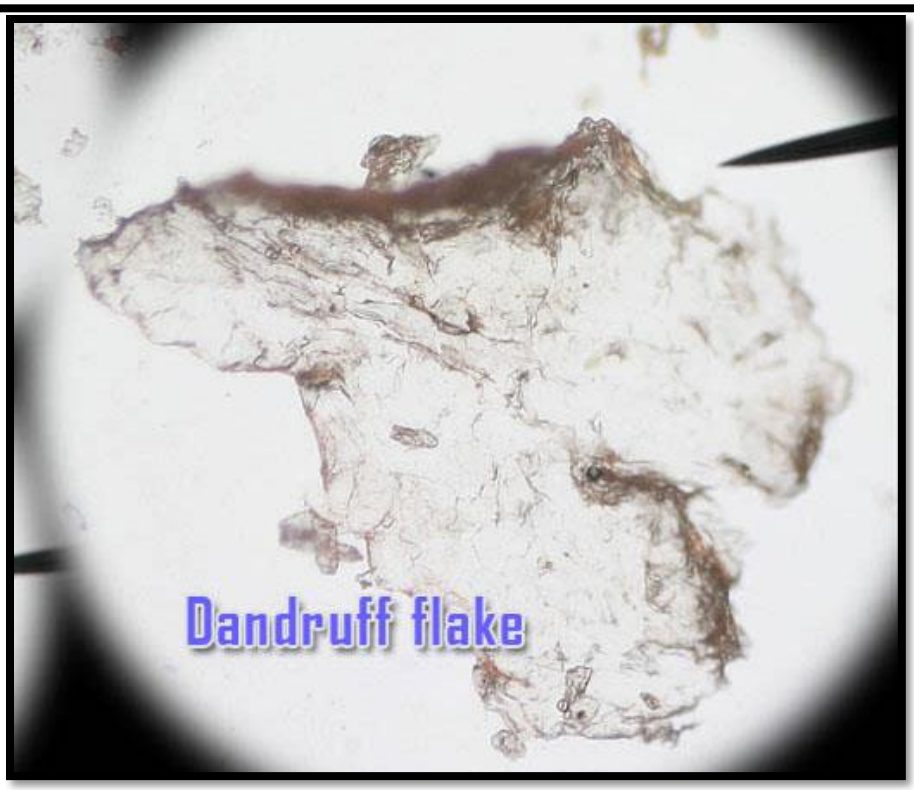
Dandruff flake

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