
OUEST
VALORISATION
Ressources d'innovation
Movepur
DV 2433
membre
SATT
SATT - Société d'Accélération du Transfert de Technologies

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According to World Health Organization:

- Air pollution kills an estimated 7,000,000 people worldwide every year.

- 90% of people breathe air that exceeds WHO guideline limits.

World Health Organization

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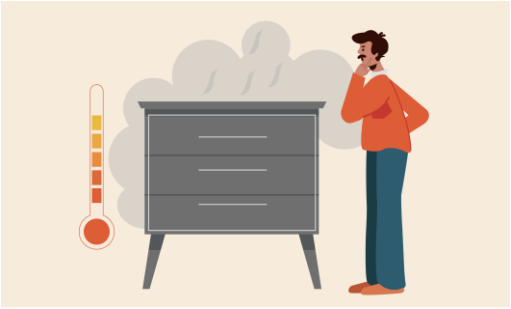
Air pollution can be everywhere:

- In city streets: due to transportation…

- At work: due to solvent handling (Ex: paint booth, laundry shop…)

- At home: due to VOC (Volatile Organic Compounds) off gassing by furnitures, toys…



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Current technologies used in air filtration/purification and limitations:

- Mechanical filters (M5, F6, F9…):

Pollutants are simply trapped and not destroyed

=> filters often have to be changed.

- Activated charcoal:

Saturates quickly and needs to often be renewed.

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Current technologies used in air filtration/purification and limitations:

- Ionisation

Not so efficient with high air flows.
Releases some ozone.

- Plasma:

Incomplete mineralization is observed, generating secondary pollutants.
Releases some ozone.

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Current technologies used in air filtration/purification and limitations:

- Photo-catalysis:

Incomplete mineralization and generation of secondary products (ketones, aldehydes...)

=> No technology can be efficient on a long term basis.

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Movepur had been carried out by 3 research teams, from ISCR (Chemical Science Institute of Rennes, France), specialists in various fields:

- Glass & Ceramics.

- Catalysis.

- Process engineering.

This led to the development of a **Catalytic Material which can destroy VOCs into harmless compounds** (like H_2O, CO_2 or O_2).

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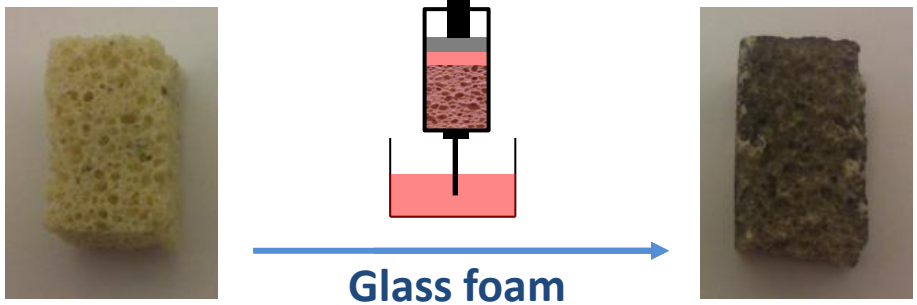
This innovation features an innovative destructive VOC cartridge, made of a foamed glass material.

This foamed glass material is impregnated with metal or metal oxides particles which will act as catalysts on VOCs.



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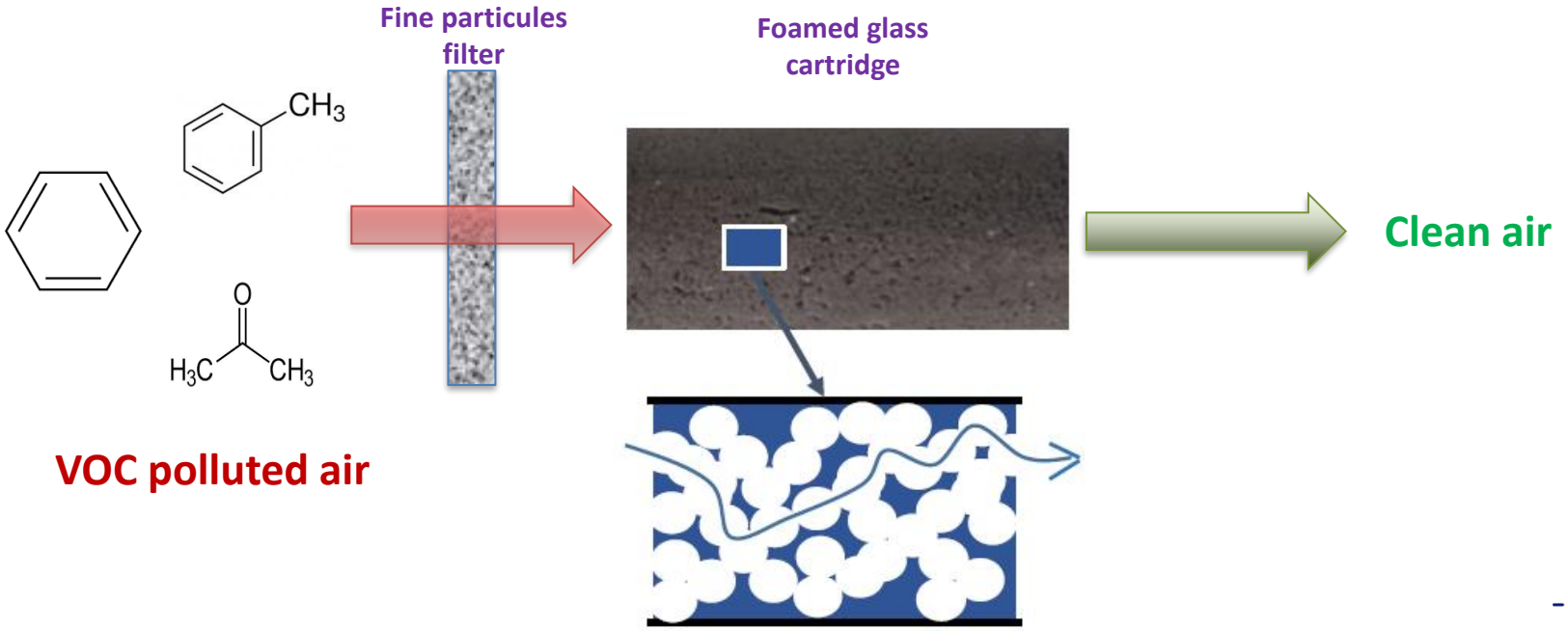
Concept:



This specific foam structure allows both a very good air flow and a maximum surface contact to react with pollutants.

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The innovation can effectively destroy VOCs under 2 different conditions:

- At room T°c, but with the co-action of an ozone stream. *(Difficult to implement)*

- At higher T°c (150-300°c), getting O_2 from ambient air to oxidize VOCs. *(Easier to implement)*

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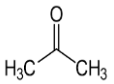
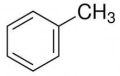
Example of reactions occuring inside the cartridge:

With ozone:

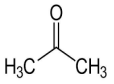


Acetone + 4 O_3 -> 3 CO_2 + 3 H_2O + 2 O_2

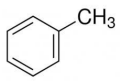


Toluene + 8 O_3 -> 7 CO_2 + 4 H_2O + 3 O_2

With O_2 from ambient air:



Acetone + 4 O_2 -> 3 CO_2 + 3 H_2O



Toluene + 9 O_2 -> 7 CO_2 + 4 H_2O

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Example of performances:

After 0.45 seconds of residence time inside the cartridge, acetaldehyde is destroyed at 99%.

Aside CO_2, H_2O and O_2, no extra degradation by-products detected.

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Advantages for this technology:

- A fully destructive and effective method for air cleaning.

- TRL = 6.

- Glass foam process optimized, and easy to implement.

- Glass foam matrix could be obtained through recycled glass (> 90%)… and is fully recyclable after use.

- Low catalyst content (0.1%) to properly work, with no catalyst release.

- Is expected to eliminate biological organisms (bacterias, viruses, COVID…).

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Applications:

- Industrial air treatment.

- Interior air treatment.

- Transportation.

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