

Gaseous Decontamination

Summary slides from course by
Tony Della-Porta and Neil Walls

Bio2ic

Summary of Gaseous Decontamination Technologies (1)

Chemical	Compatibility	Residue	Application	Cost
Formaldehyde	No problems reported	Need to neutralize with ammonia	From small cabinets, to housings to large spaces	Low
Hydrogen peroxide	Not corrosive when used correctly, can damage nylon and discolor some items. Reactive with uncoated metals	None. Degrades to water and oxygen	From small cabinets, to housings to medium sized spaces	Moderate to high
Chlorine dioxide	Bleaching of some fabrics and photographs. Reactive with uncoated metals	Waste from gen. of ClO_2 and neutralization	From small cabinets, to housings to large spaces	Gas is unstable and must be manufactured on site. Moderate to high cost

Summary of Gaseous Decontamination Technologies (2)

Chemical	Compatibility	Residue	Application	Cost
Methyl bromide	No reported damage	Extensive scrubbing required. Ozone depleting. Must be recovered.	Often used for control of insects and vermin	Moderate. Banned for general use. Use under AQIS permit. Must recover gas. Sometimes requires vacuum for adequate penetration
Ethylene oxide	No reported damage	Becomes flammable when in contact with oxygen. Extended degassing	Decontamination of papers and equipment in a chamber	High Must be done in a specialized vacuum chamber
Ozone	None reported	None expected	Has been used for water and for equipment.	Moderate to high
Vaporized Peracetic acid	Strong oxidizing agent	Acetic acid and water	Animal isolators and sensitive surgical equipment	Low to moderate

Usual stages in room decontamination process

- Set up decontamination
 - Surface clean room space
 - Put equipment and chemicals in place
 - Put validation tests in place (usually spore strips)
- Seal the room space up and turn off air supply and turn on decontamination
- Neutralise decontamination gas and then aerate room space
- Breach room space, check safe gas levels before entry
- Recover spore strips and incubate
- If validation test strips negative then decon. successful

Summary (1)

- Formaldehyde
 - Most widely used, likely to be replaced in next 10 years
- Hydrogen peroxide
 - Beginning to gain widespread adoption but expensive
- Chlorine dioxide
 - Widely used for treatment of water and has been used for anthrax remediation

Summary (2)

- Ethylene oxide
 - Flammable in presence of oxygen, likely to remain specialised use in chambers for medical instruments, papers, etc.
- Methyl bromide
 - Ozone depleting gas and highly toxic. Mainly used for agricultural purposes.
- Ozone
 - Unstable and mainly used for localised applications rather than room spaces.
- Vaporised peracetic acid
 - Animal isolators and medical instruments.
 - Very corrosive