THE UNIVERSITY OF MELBOURNE
RESEARCH, INNOVATION & COMMERCIALISATION

Polymers for the capture of volatile anesthetics

- Capture store and release volatile anesthetics
- Tunable structure for specific properties
- Recycle exhaled anesthetics

Problem

Volatile compounds such as nitrous oxide (N_2O) and fluorinated ethers including isoflurane (I) are extensively used in medicine as inhalation anaesthetics. Release of these compounds into enclosed spaces such as operating theatres or the external environment arises because only a minor proportion (if any) of inhaled anaesthetics are metabolised by the body and thus the anaesthetic is liberated upon exhalation by the patient. The release of the gases/vapours that are in common use poses a significant environmental problem because, in general, they are extremely potent greenhouse gases. In addition to the problems related to the impact on the wider environment, both short term and long term exposure to the compounds can adversely affect the health of those who work in the immediate environment where inhalation anaesthetics are in use.

Current Solution

Non-metabolised anaesthetic gases exhaled by a patient are either vented to atmosphere or are absorbed by disposable, activated charcoal.

Proposed New Solution

Metal organic frameworks have been developed that are able to absorb, store and release common volatile anesthetic gases. The materials have been shown to uptake significant quantities of the anaesthetics: N_2O, isoflurane, sevoflurane, and xenon. Can be tuned to display desired properties such as greater storage capacity or a higher affinity to a gas

Demonstrated to release the absorbed gas by applying low heating leading to the possibility of controlled release.

Benefits

The new material developed allows for the recycling of anaethetics gases as the material not only absorbs and stores the volatile gases but can release absorbed gas.

The material may make expensive but desirable gases such as Xenon a more commercially viable anaesthetic gas, with recycling.

Fig 1. Over 300 million major surgical procedures performed annually .

Technology Status

The invention has been shown to absorb anesthetic vapours in a mock surgical setting.

Opportunity

The University of Melbourne is seeking partners to accelerate the adoption of this technology through co-development, licensing or direct investment.

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