

Metal-organic Frameworks (MOFs) as novel adsorbents for respiratory protection

Up to date, activated carbon remains the most commonly used adsorbent for purification of air streams. Despite its outstanding performance in removal of several organic and inorganic contaminants, activated carbon poorly adsorbs certain hazardous substances, such as highly volatile chemical compounds with low molecular weight. Hence the application of active carbon-based filters is limited towards adsorption of several gases used in the chemical industry, as well as chemical warfare agents in the gaseous form.

For this reason, there is a constant need for developing a new class of adsorbents which could be successfully used together with activated carbon filters or work independently in the respirator systems and large-scale industrial filters.

Compounds classified as metal-organic frameworks (MOFs) are a promising group of materials with interesting adsorbing properties, which could be successful ancestors of the activated carbon-based filtering technology. MOFs of interest include CPO-27 (MOF-74), MIL-88/100/101, HKUST-1 and MOFs with open metal sites in general; for larger molecules MOFs with suitable pore structure.

FFI facilities offer unique possibilities of testing the chosen materials against various industrial gases and simulants for chemical warfare agents (CWA). Research activities will be performed in a close collaboration with the University of Bergen.

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