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Pathogen Inactivating Device for Respiratory Protective Gear

The coronavirus (SARS-CoV-2) pandemic has presented an unprecedented global health crisis, unlike any that has been seen since the Spanish flu of 1918. Without a vaccine or drug to treat SARS-CoV-2, nonpharmaceutical strategies are essential in helping to control the outbreak. Respiratory protection devices, such as masks are a vital nonpharmaceutical tool for healthcare workers as well as the general public to reduce the release of airborne viral particulates and combat spread of the virus. However, there are widespread reports of PPE shortages around the world. While this has led to a surge in homemade masks, these don't offer the same protection against SARS-CoV-2 as hospital grade PPE.

Researchers at Arizona State University have developed a novel, chemical-free device that can be used with face masks or other respiratory PPE that destroys viruses and bacteria to minimize exposure to airborne pathogens. This device enables continuous and controllable bacterial/viral inactivation to provide clean air to the wearer for the duration of use. Further, when used with a face mask, it provides synchronized filtration and inactivation to better protect the user. The device can also be used to sterilize masks to allow for reuse where PPE resources may be limited. Preliminary testing utilizing microorganisms at higher than normal concentrations in ambient air demonstrated efficacy.

The ability of this device to protect and/or decrease exposure to respiratory pathogens, makes it an essential necessity to reduce the risk of illness on a public health scale.

Potential Applications

- Airborne pathogen inactivation device for use with:
 - o Face masks
 - o Nasal devices
 - o Other PPE including gloves and face shields
 - o Smart control capability using cell phone

Benefits and Advantages

- Provides continuous, controllable and rapid removal of pathogens
- Enables synchronized filtration and pathogen inactivation
- Can be used to sterilize reusable face masks after use
- Can be configured as an insertable element for face masks with a filter pocket
- Can be a stand-alone nasal device

For more information about the inventor(s) and their research, please see

[Dr. Abbaszadegan's departmental webpage](#)

[Dr. Alum's departmental webpage](#)