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Novel Interchangeable Filter for Virus Filtration and Inactivation

Breathable Hy-Cu copper-carbon filter traps droplets and inactivates viruses with higher efficiency than disposable masks.

Researchers at Purdue University have developed a filter for virus trapping and inactivation. During the COVID-19 pandemic, face masks have been used to reduce spread of the virus. However, masks have short lifetimes and suffer from poor breathability during strenuous activities. Purdue researchers have proposed a multi-layer mask design to repel saliva droplets and inactivate respiratory viruses. The outside layer of the mask is a hydrophobic and lipophobic layer that prevents saliva droplets from entering the mask. The internal layers include a hydrophobic-copper (Hy-Cu) filter coated with diamond-like carbon (DLC) to inactivate viruses and non-woven layers to capture small microdroplets. The Hy-Cu filter is highly breathable, offering 10% less air resistance compared to disposable masks and KN95 masks. The Hy-Cu filter has 90% filtering efficiency and 99% virus inactivation over a period of two hours.

Technology Validation: Testing results showed the Hy-Cu filter to be highly breathable and have higher filter efficiency and virus inactivation than the non-woven layer of disposable masks.

Advantages:

- Hy-Cu filter has higher filter efficiency and virus inactivation than the non-woven layer of disposable masks.

- Hy-Cu filter has higher breathability than disposable masks.

Applications:

- Hy-Cu filter can be adapted to existing face coverings.

TRL: 3

Intellectual Property:

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Category
Digital Health & Medtech/Wearable Health Tech & Biosensors
Aerospace & Defense/Advanced Protective Materials & Wearable PPE

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