

## High-quality filtering material for the local fabrication of masks



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I am a neurophysiologist, and my ERC-funded research explores how artificial light influences the biological clocks of all living creatures and how we can improve the lives of people most vulnerable to, for instance, depression, fatigue and shift work. Once the coronavirus crisis broke out, I decided to temporarily shift my research focus and contribute to the health crisis response.

The transmission of the SARS-CoV-2 potentially via respiratory droplets, dramatically increased the demand for high-quality respirator masks, causing a lack of personal protective equipment for healthcare workers.

My response to the crisis started spontaneously. I became inspired by a Turkish tailor living in our town, who offered to make face masks for hospitals in Leiden, free of charge. This generous offer encouraged me to search for a safe and commonly available material that would allow hospitals to produce their masks.

One of the many ideas I received was from a medical engineer at the Leiden Medical Center. He proposed a particular sterilisation and wrapping material routinely used for surgical instruments (Halyard Quickcheck H300), suggesting that it may be suitable for the production of FFP2, N95, or surgical masks. These types of masks are recommended for healthcare workers by the World Health Organisation.

And indeed: we found that this broadly available wrapping material met the required filtering criteria. Three layers of the material achieved a filter efficiency close to the FFP2 and N95 masks. Two layers meet the

FFP1 respirator mask's criteria, while one layer was equivalent or even better than a 'surgical mask'. The material was moreover shown to be very resilient to repeated sterilisations, making it even more attractive as an option.

The model we propose is relatively easy to make, and it is designed to enable breathing through the entire surface, which increases breathability and comfort. We think that it could be especially useful for hospitals in rural areas, where protective equipment may not be as readily available.

To make our discoveries accessible to people worldwide, we have set up a website (<https://coronamedicalmasks.org/>) So far it is available in the 15 most spoken languages, covering over 85 % of the world population. We are already seeing visits from a broad range of countries, such as Nepal, Turkey, and African countries. Hopefully, many more people from different parts of the world will benefit from this discovery.

Last but not least, to get all of this done, we relied on informal and already existing contacts with fellow researchers from different backgrounds and countries. They all contributed eagerly, rapidly, and for free. Clearly, science has the potential to bring people together, regardless of their country or religious background.

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