

## -“VIRUMASK” -

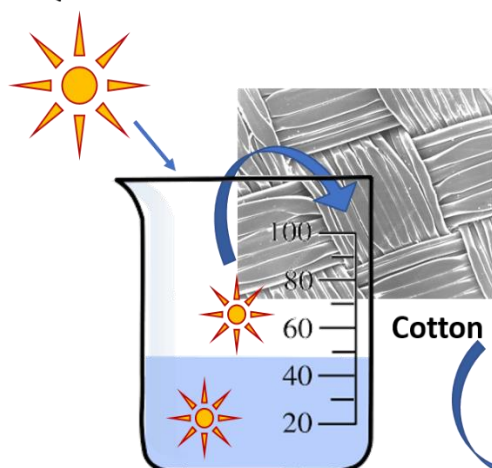
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The *Covid-19* virus and related Corona disease is highly spreadable due to transmission from one person to another person. When people with COVID-19 breathe out or cough, they expel tiny droplets/splashes that contain the virus. These droplets can enter the mouth or nose of healthy persons, causing an infection to occur. The disease is most contagious when a person’s symptoms are at their peak. As number of patients is increasing on daily basis together with the number of death. Hence, our major concern is to have a good quality personnel protective equipment including Mask apron etc. Nowadays, the masks/PPEs available in the market are permeable to air while filtering 95% of the particulate matters; although it doesn’t include the anti-bacterial, anti-viral, anti-fungal properties, as it is usually claimed as per the N95 specification. Even we have tested market available N95 mask where we did not find any disinfectant inside it, which can prevent the bacteria, virus, and fungi. Nevertheless, the companies are selling the mask at very high price, which is not as such affordable for the common people of India, considering the current socio-economic conditions.

The mask prepared by our technology consist of 3-ply meltblown PP fabric, which have Nanopores. Moreover, the Nano-confined QDs are attached with the melt-blown fabric with the help of a polymer matrix/ coatings, which is in fact super-hydrophobic in nature to develop N95 or higher equivalent with advanced features. The superhydrophobic nature of the polymer acts as a highly bio-repellent “Firewall” to prevent the attachment of any sort of viral and bacterial RNA/DNA to its surface. If by any chance, any unknown virus/ bacteria can manage to attach to this protective shield, as applied in the second layer of a regular 3-ply mask, it will need to face the extremely bactericidal and virucidal

### Antiviral Mask – “Viro-MASK” – Complete Safety

M-QD Embedded into Nano-Oxidic virucidal Matrix



Supported into the Anti-fungal

Self-Healing Polymers

- ✓ Anti-Viral
- ✓ Anti-Bacterial
- ✓ Anti-fungal
- ✓ Flexible & Reusable
- ✓ Simple Steam Sterilization

Triple filter  
Guarding for health

01 Outer layer:  
Spunbond non-woven  
fabric, filtering large  
particles, anti-droplet

02 Middle layer:  
Thickened meltblown  
cloth, filter fine particles,  
bacteria

03 Inner layer:  
Spunbond non-woven  
fabric, hygroscopic,  
filtering fine particles

Efficient three-layer filter layer, effectively filter particles, bacteria, dust, droplets. And maintain permeability.

Unit Cost: 50-55/- Only



QDs, which are homogeneously distributed over the whole fabric *via*. Nano-confining oxidic particles. However, material used in the mask is superhydrophobic in nature and hence does not allow the any water droplet containing infectious microorganism to penetrate 3-ply layer. The self-healing nature of the polymer even rectifies any patches in its security shield over steam sterilization by the end user without compromising any of its security features. By this way, our technology will be very useful and effective in stopping the pandemic like COVID-19. The advanced features include:

A. N95 and N99 standard with additional features; B. Reusable for 1-2 week; C. Simple Steam sterilization; D. Anti-bacterial; E. Anti-Viral; F. Anti-Inflammatory; G. Anti-fungal; H. Nanotechnology based healthcare; I. Superhydrophobic to ensure complete safety; J. Many-folds Cheap than market available masks and PPEs; K. MSDs are available on valid request.

➤ **Evidence of initial traction**

➤ Please follow the Youtube Videos of our group in the following links:

Next-Generation Anti-Viral Mask Using Embedded QD-1

<https://www.youtube.com/watch?v=gLVwNhPXstA>

➤ **Testimonials**

1. *Top 30 in Hack the Crisis in India – Hackathon organized by Garage 48 together with the Dept. MeitY, Govt. of India.*

2. *Top 15 in The Global Hackathon organized by Garage 48 (10<sup>th</sup> Place) in the International platform.*

<https://www.guaana.com/challenges/shmtfpQ8wmtce6Ne5/results/vLps4z95vb9LSFzR3>

<https://m.economictimes.com/small-biz/startups/newsbuzz/india-joins-global-hackathon-to-provide-solutions-to-covid-19/articleshow/75084744.cms>



➤ **Patent Application:**

➤ We have filed a provisional patent with the Application no. 202031016184 dated 15.04.2020 under the title “A novel anti-pathogenic face-mask employing the Quantum Dots embedded into a self-healing and super-hydrophobic support” on our technology.

➤ **Budgetary Requirement**

- ✓ 2 months in total; 15 days for Testing & Certification and another 15 days for prototype optimization as per the test results. The last month will be needed to set up a pilot unit for bulk production.

➤ **Budgetary Requirement**

<b>Head</b>	<b>Cost</b>	<b>Justification</b>
<b>Capital Equipment</b>	10,00,000 + GST (18%) = 11,80,000 INR	For fabrication of principle, mask making machine and the accessories.
<b>Anti-viral Coating</b>	5,00,000 + GST (18%) = 5,90,000 INR	For fabrication of a reactor for nanosystems
<b>Raw materials like textile for mask as well as sanitization and marketing</b>	5,00,000 (inclusive GST)	Textiles of 3 types For mask manufacturing & includes R&D optimization.
<b>Chemicals cost</b>	5,00,000 INR (inclusive GST)	Incorporation to masks to obtain the advanced features like Anti-viral super-hydrophobic nature. Includes R&D optimization.
<b>Testing and Certification</b>	2,00,000 INR (inclusive GST)	ICMR certification for bulk production
<b>Recurring cost</b>	1,00,000 INR	On process, expenditures will include all travelling and transportation charges.
<b>Institute Overhead</b>	5,00,000 INR	
<b>Total:</b>	<b>35,70,000 INR</b>	