Pure breATH

Omarli, Ayaz (School: Young Talents Lyceum)
Ibrahimov, Omar (School: Young Talents Lyceum)

Currently, air pollution with organic and biological harmful substances, which cause the increase of various respiratory diseases and severe forms of allergies, is a serious concern. The COVID-19 pandemic, which covers the whole world, has caused special damage to human health. In this regard, even today, the danger of quarantine is to prevent the spread of the deadly virus. In order to prevent the terrible consequences of mandatory quarantine, we have developed a multi-filtration system based on new innovative technology for cleaning indoor air: • dust collecting filter; • ultraviolet (UV) radiation source for photocatalyst irradiation; • Filter consisting of transparent glass beads coated with TiO2 nanoparticles (NP); • activated carbon filter with adsorbed Ag NP; • engine and fan to control airflow; • engine and fan controls. Airflow containing dust microparticles is filtered through a dust collector - a non-woven filter (polypropylene, nylon, etc.). The air stream comes into contact with the outer surface of the dust collector, and the dust-free air then continues its movement and comes into contact with the photocatalytic filter to remove organic pollutants and viruses. It was determined that UV light at a wavelength of 253.7 nm from 36 W UV lamps affects titanium dioxide, which has photocatalytic activity. When this happens, electron-hole pairs and hydroxyl radicals (OH) are formed on the surface of nanoTiO2, which causes the decomposition of volatile organic compounds, and viruses. Then, an activated carbon filter with adsorbed Ag NPs ensures additional air purification from microorganisms and viruses by having a strong bactericidal effect. Our air purifier removes 99.99% of organic compounds, germs, viruses and bacteria from the air.

Awards Won: