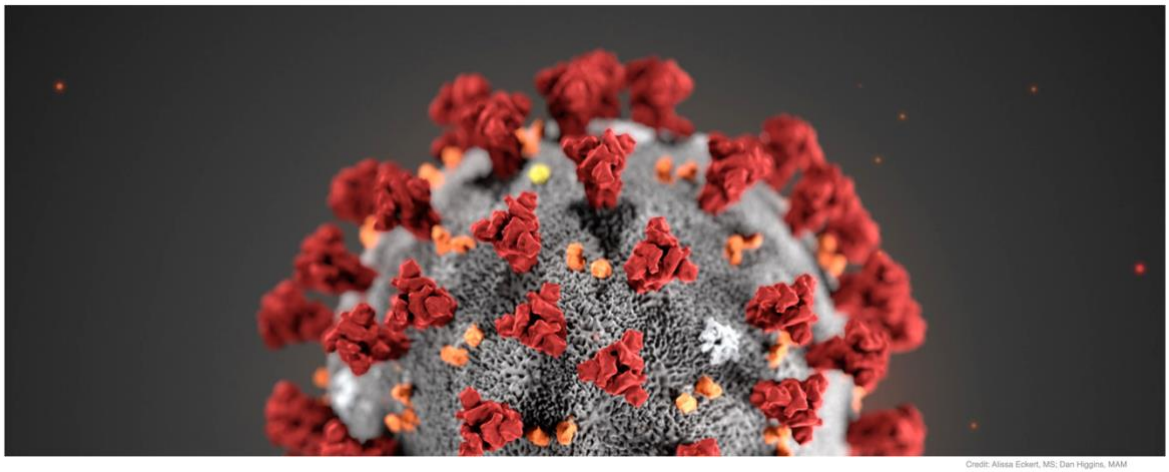
Copper3D achieves important validation against Human Coronavirus and announces the expansion of its portfolio of antimicrobial materials and industrial applications.



Copper3D, a pioneer company in antimicrobial materials for the 3D printing industry, has had a very intense 2020, in a period that has been dominated by the ongoing COVID-19 pandemic with a global effort to find effective solutions to protect ourselves from this virus, as well as hundreds of other microorganisms dangerous to humans. Copper3D has been working in infectious control development well before the Coronavirus pandemic began, having been founded in January 2018 in Santiago, Chile, the world's biggest producer of copper and an expert nation in antimicrobial solutions based on this element.

Since its inception, Copper3D has grown rapidly, with many achievements and has built a global network of more than 20 distributors worldwide, with sales to more than 50 countries. The company has been awarded two NASA research funds, in addition to recognitions such as being considered within the World Top 5 of companies that are impacting the 3D printing materials sector, and being mentioned in the prestigious World Economic Forum.

Fig 1. Antimicrobial applications 3D printed with Copper3D materials

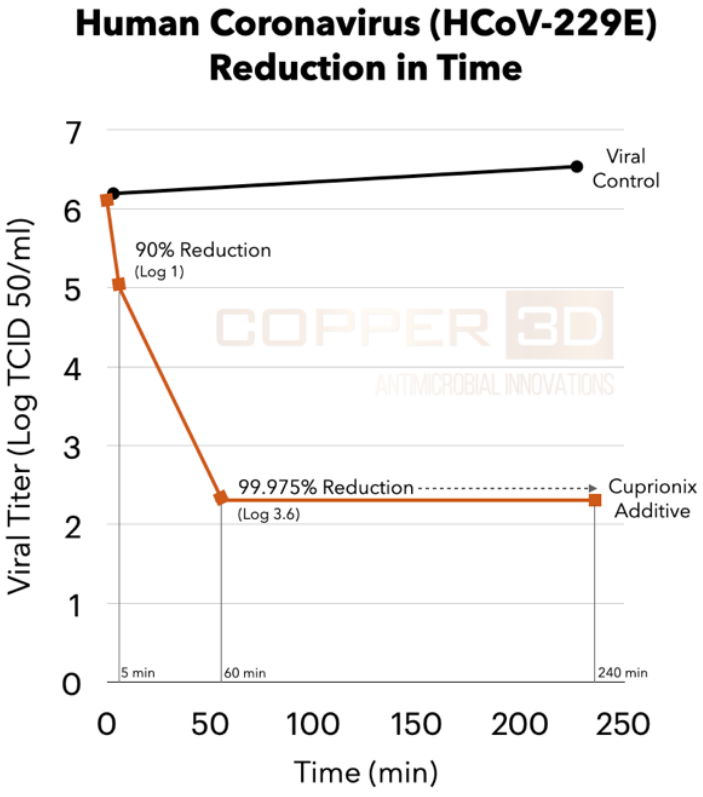
Antimicrobial Additive tested against Human Coronavirus

Copper3D has been working for the last two and a half years to validate that its materials behave as powerful "active materials" capable of eliminating a wide range of microbes dangerous to humans, and since last year it also began validating their material potential against viruses, being a validation against HIV the first experience of this kind in laboratory settings.

Dr. Claudio Soto, Medical Director of Copper3D, said: “Laboratory validations with viruses have a much higher degree of complexity due to the additional safeguards that must be taken, the type of equipment and highly specialized personnel to perform this kind of tests, and the laboratories prepared for this type of studies are not commonly found as they require high biosafety levels”.

This is why Copper3D has chosen the Pasteur Institute (Lille, France) to carry out this new test against the Human Coronavirus.

Dr. Soto mentions regarding this new validation: “As a company we are always looking for our materials to meet the highest industry standards and therefore we decided to test the antiviral capacity of the additive present in all Copper3D products (Cuprionix® additive), against Human Coronavirus strain 229E (HCoV-229E), under the EN14476 + A2 standard, with extraordinary results so far”.



Institut Pasteur, USM - Unité de Sécurité Microbiologique
Test report N.200410-EN

Among what was observed, the additive shows a very high antiviral efficacy from the first 30 seconds, capable of reducing the viral load of the Coronavirus by +99.9% in less than one hour.

This process is very quick and begins in the first 30 seconds to see a rapid decrease in viral load of 60.189% (Log 0,4), 90% (Log 1) of reduction at 5 minutes, until reaching a plateau near 60 minutes with a 99.975% of viral reduction (Log 3.6). (Table 1)

On the other hand, and equally relevant, is that this additive did not show any degree of cytotoxicity in this test, therefore we can conclude that it is also safe for use in applications that will be in contact with patients or animals.

Table 1

The element that finally eliminates this virus (and other microorganisms) effectively are **the copper ions released in a controlled manner by the additive**, and functions mainly through two mechanisms of action:
First, the rupture of the envelope that covers and protects the virus from the external environment, and second, denaturalization (rupture) of the viral RNA, with which it is completely inactivated. (Fig 2)

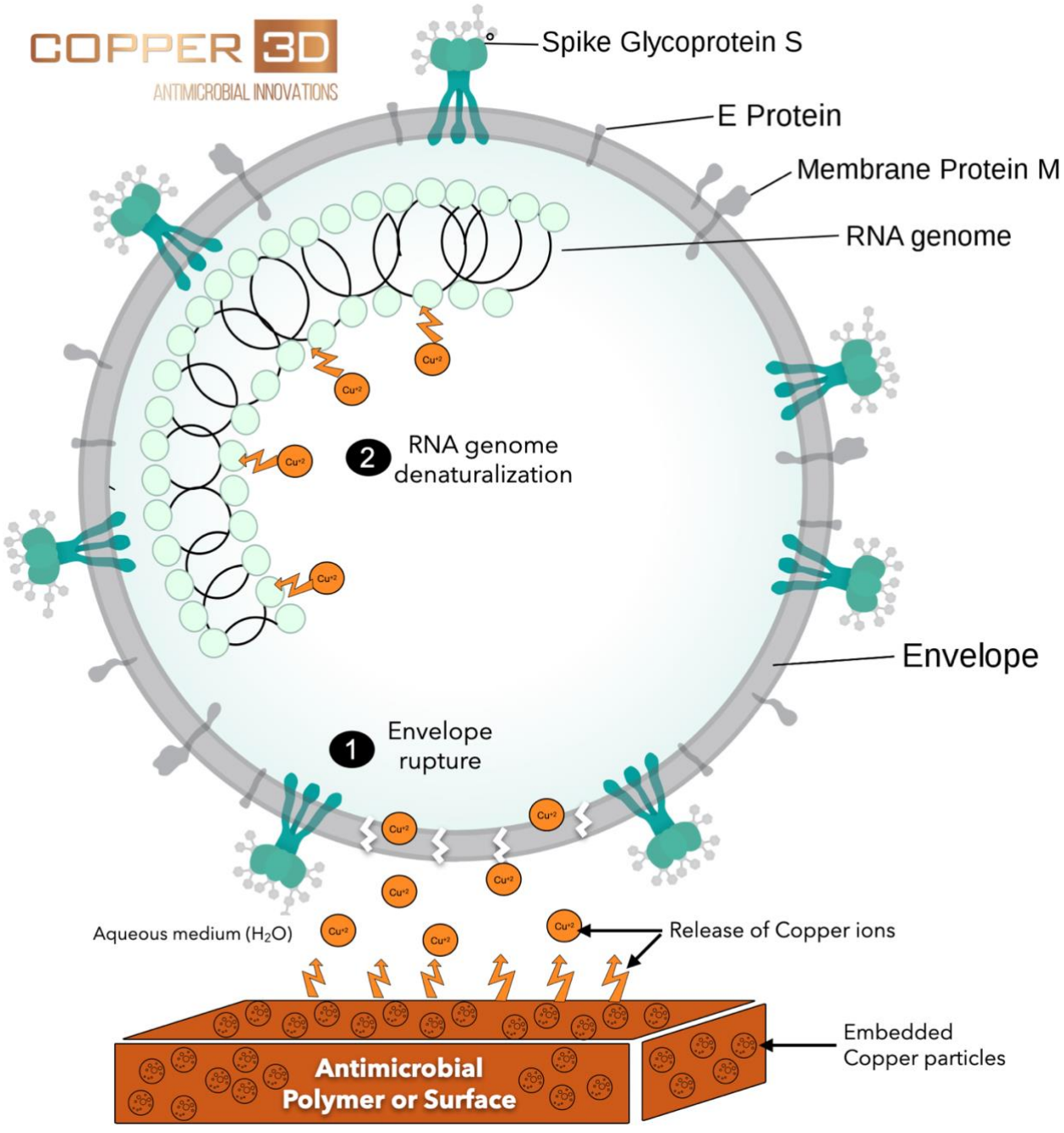


Fig 2. Schematic diagram of the coronavirus. Credit: Binte Altaf
Mechanism of action of Cuprionix® additive by Copper3D

Antimicrobial Additives, Materials, and Solutions.
The Future of Copper3D

2020 has been an important turning point in heightening the awareness of the general population regarding the dangers that exposure to viruses, bacteria, fungi and other microorganisms mean. The COVID-19 pandemic has put this problem on the front pages throughout the year and we are quickly learning the global consequences that a pandemic can have in terms of pressures on healthcare systems, disruption to logistics chains, country wide border closures, social, labor, and economic consequences. The Copper3D team sees a promising future ahead based on the excellent results of their Cuprionix® antimicrobial additive technology. Daniel Martínez, Director of Innovation of Copper3D, said:

“Today we have a powerful tool to deal not only with the Human Coronavirus but with a large number of potentially lethal microorganisms for humans. We see a very interesting future for our company as the number of applications in the 3D printing world and outside the 3D industry are enormous. In the 3D printing industry, we already have a path that we want to complement with new materials in different additive manufacturing technologies, with validated and certified antimicrobial performance. Regarding our Cuprionix® additive it can be combined with a wide range of polymeric materials that are used in the world of industrial manufacturing such as injection molding or thermoforming. This year we had our first experience on *Antimicrobial Injection Molding* with the Nanohack Maverick mask that has already been tested in the laboratory, and in the short term we will see interesting antimicrobial solutions in several Industries such as aeronautics, food packaging, office spaces, antimicrobial furniture/surfaces for hospitals, antimicrobial medical devices, products for moms and babies, paintings, coatings, as well as countless antimicrobial solutions in the world of mass consumer products, one of the first that comes to mind are cell phone cases, which have already been proven to have a very high bacterial load”.

Fig 3. Potential applications of antimicrobial additives and polymers.

Andrés Acuña, CEO of Copper3D ends with the following reflection: “Our company has always been linked to innovation as a powerful tool to face great challenges and problems with a global impact. We also understand our limitations and we know that there are many problems that we need to work on as an ecosystem to solve them, for this reason we believe so much in collaboration amongst industry and sector experts.
We believe that with intelligent designs of applications and our antimicrobial / active materials with Cuprionix® additive technology, we can come up with many powerful ideas to tackle such serious problems as the COVID-19 pandemic. We hope this new validation will open up many new lines of development in both 3D printing and the world of industrial manufacturing where, given the scale that can be achieved, many people around the world could be quickly reached with new antimicrobial solutions that could save millions of lives".

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