This technology can turn metal surfaces into 'dead zones' with bacteria

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As we know, bacterial pathogens can live on metal surfaces for days, especially in public areas like doorknobs, stair handrails, thus becoming a threat to public health.

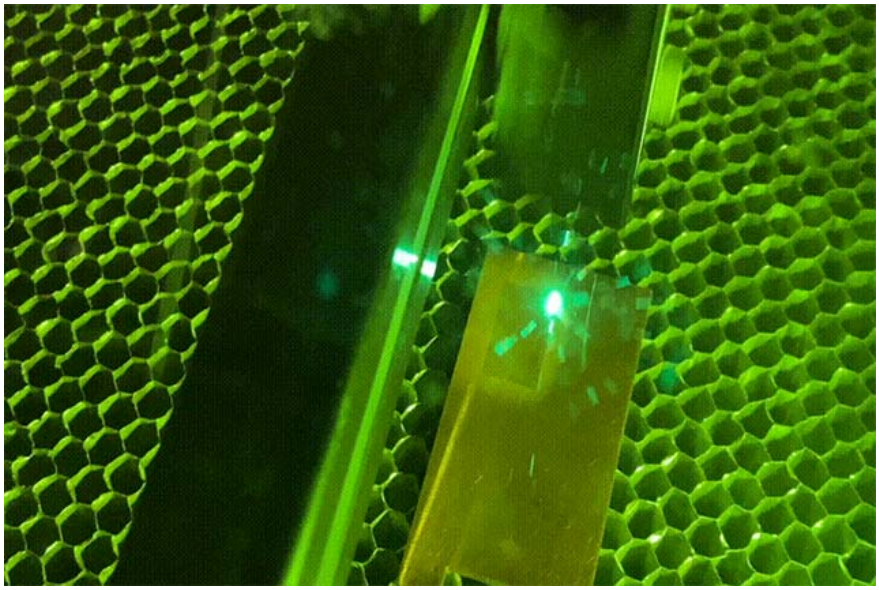
Recently, Purdue University engineers have created a laser treatment that can turn any metal surface into a `` grim reaper " that kills bacteria quickly by simply interfering with the structure. surface.

Specifically, according to research published in Advanced Materials Interfaces, the scientists have demonstrated that this technique allows the metal surface (in the experiment is copper) to immediately kill bacteria, including viruses like MRSA.

'Copper has been used as an antibacterial material for centuries. However under normal conditions, the natural copper surface takes hours to kill bacteria. To improve this, we have developed a laser-based molecular structure modification technique that enhances the effectiveness of bactericidal properties on copper surfaces', said associate professor of materials engineering Rahim. Rahimi, head of the research team said.

However, this technique has not been shown to kill viruses, such as the new strain of Corona virus that caused the COVID-19 pandemic, because they are much smaller in size than bacteria, and have the characteristics of Biology also has many differences.

Back on the issue of bacteria, Rahimi's team has now started testing the technology on the surfaces of different metals and polymers, with the goal of reducing the chances of bacterial growth, and establish a biofilm system on devices such as orthopedic implants or patches that can be used to kill bacteria in chronic wounds without antibiotics. In addition, this technique can also be applied to metal alloys known to have antibacterial properties.



Laser surface treatment

Metals such as copper often have a very smooth surface, which greatly reduces the ability to kill bacteria. The technique developed by Rahimi's team uses lasers to create nano models on metal surfaces. These models will form a solid structure that increases the surface area, making bacteria more exposed to the metal surface, so that they will also be destroyed faster.

In fact, scientists have previously used different nanomaterial coatings to enhance the antibacterial properties of metal surfaces, but these coatings are easily broken and can be toxic to. environment. Rahimi's new method creates micron and nano samples directly on the target surface without changing most metal materials.

The dual-effect laser construction not only improves direct bacterial contact, but also makes the metal surface more 'hydrophilic'. In orthopedic implants, such surfaces allow bone cells to attach more strongly. Because of its simplicity and potential for future technological innovation, the researchers believe that it could easily be applied to existing medical device manufacturing processes.