Nanotech Coating Boosts Cell Signals on Trains

Kyle Maxey posted on September 01, 2016 | Comment

If you've ever careened through upstate New York, skirtling along the Hudson on a passenger train, or crossed through Europe by passing your time in a bar car, you've probably realized that trains offer terrible signal reception.

It makes sense. A train is essentially a metal tube that's not too different from a Faraday Cage. “But wait,” you'll say, “shouldn't a train's windows provide ample room for signals to pass unabated?” Well, you'd be right, but those windows are often coated in a thin metal sheet meant to allow light into the cabin while deflecting heat.

So, in the end, a train is woven together from materials that don't mesh with modern communications. But researchers at the École Polytechnique Fédérale de Lausanne (EPFL) say they've created a new way to manufacture window coatings that will keep train cars cool and open them up to better information flow.
Using an extremely precise, programmable laser, the EPFL team inscribed a special pattern into the metal coating of a traditional train car window. Though this pattern is imperceptible to the human eye, it removes enough coating (roughly 2.5 percent) to allow electromagnetic signals to pass through the car’s glass without compromising the windows insulating properties.

“Measurements taken by experts from the University of Applied Sciences and Arts of Southern Switzerland (SUPSI) have demonstrated that this works,” said Andreas Schüeler, of EPFL’s Nanotechnology for Solar Energy Conversion Group. “Mobile reception is just as good in the train through laser-treated insulating glass as it is through ordinary glass”.

Though this new window coating manufacturing method has proven itself in laboratory settings, it still has some way to go if it wants to make it mass manufacturing. To help that project along its way, the Bern–Lötschberg–Simplon railway has decided to install the new EPFL windows on 36 of its NINA trains to test how the technology works in the real world.

If the EPFL’s new window treatment does work out, the technology could be ported to other applications. Currently EPFL researchers believe that there are a number of applications that could use their new window coating techniques, especially when it comes to architecture.

For more locomotive news, take a ride on the solar train.