

Anti-bacterial patterned surfaces and methods of making the same**Abstract**

The present invention relates to a substrate comprising a plurality of integrally formed surface features, said surface features being micro-sized and/or nano-sized, said surface features comprising at least one pointed terminus. As a result of this unique surface, said substrate exhibits a biocidal activity because the terminal ends of said surface feature pierce through cell membrane of any microbial cell that comes into contact with the substrate, thereby causing cell deformation and lysis. The present invention also relates to a method producing said substrate. By a simple treatment of copper or zinc foil with a reagent solution comprising an alkali and an oxidizing agent, $\text{Cu}(\text{OH})_2$ nanotube arrays, CuO nano-blades and ZnO nano-needles are prepared. These surfaces are proven to be very effective in killing bacterial (such as *E. coli*) via a physical interaction.

(Figure 2C)