Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

Environmental friendly and scalable fabrication of antibacterial ZnO-nanostructured surfaces[1] ABINASH TRIPATHY, ATHANASIOS MILIONIS, MATTEO DONATI, ETH Zurich, CHANDER SHEKHAR SHARMA, IIT Ropar India, FEI PAN, MANIURA, KATHARINA WEBER, QUN REN, Empa, Switzerland, DIMOS POULIKAKOS, ETH Zurich, EMPA SWITZERLAND COLLABORATION — In this work we show that nanostructured ZnO surfaces, fabricated by a fully water-based protocol, exhibit enhanced bactericidal action against *E. coli*, both on the surface itself as well as remotely, and in the absence of sunlight (bacterial killing efficiency of 9250 cells $cm^{-2}hr^{-1}$). They are also able to disinfect contaminated water (>99.98% elimination of bacteria) while satisfying the legal limits on the released Zinc ion concentration (0.73 0.15 ppm). Using the same ZnO nanostructures and adding hydrophobization, we obtain self-cleaning surfaces with ultra-low bacterial adhesion. This is achieved either by deposition of a water-soluble fluoroalkylsilane or ethanol-soluble stearic acid. The resulting impressive and tunable antibacterial behavior, combined with the 'green' and scalable fabrication, render these materials excellent candidates in sustainable antibacterial and water purification applications.

[1]Horizon 2020 research and innovation programme, ERC Advanced Grant, Commission for Technology and Innovation

Abinash Tripathy
ETH, Zurich

Date submitted: 12 Aug 2020 Electronic form version 1.4