8QLIRUP ¿OPV RQ ' ' VXUIDFHV JDGJHWV OHDGLQJ WR TXDVL LQV to reduce healthcare acquired infections

During the last few decades, the increase of infections by toxic pathogens/bio lms leading to hospital-acquired infections (HAI) has motivated work in the area [1-2]. More advanced antibacterial lms presenting uniform distribution, high adhesion to exible non-thermal resistant substrates, mechanical resistance and faster bacterial/bio lm inactivation under light or in the dark are needed due to health concerns [1]. TiO$_2$ lms have been used under light>387 nm generating highly oxidative radicals as bactericide lms for many years [2]. However, its restricted absorption of solar/visible light and slow bacterial inactivation kinetics has motivated workers to dope TiO$_2$ with Cu or Ag to shi the absorption of the lms to the visible region. is doping also precludes recombination of the photo-generated charges. Stable, adhesive uniform lms of TiO$_2$ inactivated bacteria within 40 min [2]. But TiO$_2$/Cu (Cu 0.1%) lms led to bacterial inactivation < 10 min under actinic light (4mW/cm2) [3-4]. Next, the sputtered Cu for 5-10s (0.01% by weight/ppb levels) on ZrO$_2$-TiO$_2$ layers on polyester [5] accelerated the kinetics by a factor of 3 with respect to lms where the Cu was absent. e Cu intra-gap states seem to: a) accelerate the indirect transitions in the TiO$_2$

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