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DBD produced ozone in forced convection as a facemask sterilizer JOSEPH SCHWAN, TROY ALVA, GIORGIO NAVA, CARLA BERROSPE RODRIGUEZ, JOSHUA MORGAN, JUSTIN CHARTRON, LORENZO MANGOLINI, University of California Riverside — The COVID-19 pandemic and its rapid expansion led to a shortage of PPE and an immediate lack of facepiece respirators (FPR) forcing reuse of contaminated single-use N95 and FFP3 masks. Shortage and reuse have led to deaths of over 1000 medical personnel as of May 18$^{\text{th}}$ and a second wave looms over the horizon. Here we present a plasma-enabled technology that can contribute in the fight against the pandemic. FPR sterilization is a field emerging as an attempt to stem the tide of FPR shortages and increasing waste from PPE. We describe the development of an air-fed dielectric barrier discharge plasma-based method of simple extremely low-cost FPR sterilization. While ozone as a passive sterilizing method has been implemented in the past, where material is placed in a container filled with ozone, a flow-through forced convective design has proven more than 400% as efficient a sterilization method on beta10-bacteria. Effectiveness against differing pathogens (viral, bacterial, and fungal) as well as ozone production measurements using transient UV absorption and FTIR spectroscopy were also performed. Repurposing a plasma globe toy's circuitry as an ozone source achieves sterilization and lends itself to a cost-effective portable sterilization system.

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