

Abstract Submitted
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Analysis of Secondary Chemistry and Treatment of Burn Wounds with Nonthermal Plasma Induced Effluent¹ MARK GOLKOWSKI, S. REED PLIMPTON, University of Colorado Denver & Anschutz Medical Campus, CZESLAW GOLKOWSKI, Super Pulse — Exploitation of non-thermal plasmas in the biomedical setting is a rapidly growing field with a large number of diverse technologies under investigation. Potential applications of such devices range from instrument sterilization to clinical therapy. One of the key hurdles to the implementation of non-thermal plasma technologies is the relatively poor understanding of the chemical processes taking place. Our group has recently completed precise analysis of chemical species created by our indirect exposure non-thermal plasma device with hydrogen peroxide additives. Reactive nitrogen and oxygen species are observed using optical absorption spectroscopy. We report the unique detection of short lived hydroxyl radicals at a significant distance from the discharge using electron paramagnetic spin resonance trapping. The hydroxyl radicals are shown to be generated in secondary ozonide based chemical processes away from the discharge. The plasma device is applied to a porcine model of infected full thickness burn wounds. The bacteria load reduction after treatment with our device is shown to be 10-100 fold improvement over Silvadene which is the main treatment currently used in the clinic.

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Mark Golkowski
University of Colorado Denver & Anschutz Medical Campus

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