

Abstract Submitted
for the GEC06 Meeting of
The American Physical Society

The Plasma Pencil: A Novel Pulsed Plasma Source* TAMER AKAN, XINPEI LU, MOUNIR LAROUSSE, Old Dominion University — One of the attractive characteristics of nonequilibrium plasmas is their enhanced plasma chemistry without the need for elevated gas temperatures. Using nanoseconds high voltage pulses the electron energy distribution function can be controlled in a way to shift it towards the high-energy tail. Higher electrons energies lead to enhanced gas phase chemistry. This is advantageous in material processing applications where advanced chemical processes under low temperature conditions are desirable. In this paper, we report on a novel pulsed cold plasma source, the “plasma pencil” [1], and its unique characteristics. The plasma pencil is capable of generating a cold plasma plume several centimeters in length. It exhibits low power requirements and by using helium as a carrier gas the gas temperature remains low for extended periods of operation. The plasma plume emitted by the plasma pencil can be applied to bare skin without causing any heating or painful sensation. In this paper, the characteristics of the plasma pencil will be discussed. These include the current-voltage characteristics, plume temperature, emission spectra, and the time and spatial evolution of the plasma plume. *Work supported by the Air Force Office of Scientific Research (AFOSR).

[1] M. Laroussi and X. Lu, “Room Temperature Atmospheric Pressure Plasma Plume for Biomedical Applications”, *Applied Physics Letters*, Vol. 87, 2005.

Mounir Laroussi
Old Dominion University

Date submitted: 16 Jun 2006

Electronic form version 1.4