Plasma Consult

SLAN plasma sources

Fig. 1: SLAN plasma sources

Large area lubricant removal by use of capacitively coupled RF and slot antenna microwave plasma source

Presented at ICMCTF96 April 10 – 14, 2000 USA

The work described below was performed using a PlasmaConsult SLAN-I-DS microwave plasma source.

D. Korzec and J. Engemann

Large area lubricant removal by use of capacitively coupled RF and slot antenna microwave plasma source

Microstructure Research Center - fmt, University of Wuppertal, Germany

Abstract

Surface cleaning as an important step prior to workplace processing historically relies on the use of wet chemicals. Part of these such as fluorocarbons have been banned because of their detrimental effect on the environment. In the search for alternatives to date a combination of water-based preprocessing followed by a plasma treatment has been found to be most effective. This paper concentrates on the latter with a special focus on effectiveness and scaleability of high performance plasma sources.

The process performances of two types of advanced plasma processors are compared: (i) a capacitively coupled 13.56 MHz plasma processing unit (PPU-400) equipped with a 40 cm diameter RF table and (ii) a 2.45 GHz slot antenna applicator (SLAN II) with a 67 cm diameter quartz plasma chamber. For the spatial characterization of plasmas in both reactors, axial and radial ion concentration distributions have been measured using a double Langmuir probe (DLP). For a power density of 4.8 W cm^{-2} ion concentrations of 6 × 10^{10} and of 4 × 10^{11} cm^{-3} were measured in the PPU-400 and SLAN II, respectively. Owing to energetic ion bombardment caused by RF self bias, the PPU-400 is especially suited for cleaning contaminated metal parts even if inorganic residues are present. Removal rates of up to 4.5 um min^{-1} were achieved. In contrast, microwave excitation yields much more free radicals and excited atoms/molecules at reduced particle energies. Consequently non-biased work pieces are cleaned faster in the SLAN II reactor compared to PPU-400 when only organic debris is to be removed.

A main challenge remains that, depending on the plasma excitation

APPLICATION NOTE

SLAN plasma sources

APPLICATION NOTE

Plasma Consult

parameters, the removal rates strongly vary with temperature and ion/radical concentration in both reactors. This leaves enough room for future reactor design and process optimization.

Surface and Coatings Technology
Volume 89, Issues 1-2, 15 February 1997, Pages 165-176

For further information please contact:

Plasma Consult

JE PlasmaConsult GmbH
Rainer-Gruenter-Str. 21, Geb. FN
42119 Wuppertal
Germany

Tel. ++49-202-28397-0
Fax ++49-202-28397-123

contact@plasmaconsult.de
www.plasmaconsult.com

SLAN plasma sources