Express Mail No.: ER864793525US

PATENT
Attorney Docket No.: ZON-002

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT:	Roman Chistyakov		
SERIAL NO.:	10/065,629	GROUP NO.:	2821
FILING DATE:	November 04, 2002	EXAMINER:	Lee, Wilson
TITLE:	METHODS AND APPARATUS FOR GENERATING HIGH-DENSITY PLASMA		

Commissioner for Patents
Alexandria, Virginia 22313-1450

AMENDMENT AND RESPONSE

Sir:

The following amendments and remarks are responsive to the Office Action mailed on October 07, 2003 in the above-identified patent application. Entry and consideration of the following amendments and remarks, and allowance of the claims, as presented, are respectfully requested. A Petition for a two–month extension of time, up to and including Monday, March 08, 2004 is submitted herewith. The Commissioner is hereby authorized to charge the extension fee, the additional claims fee, and any other proper fees to Attorney's Deposit Account No. 501211.

Please enter the following amendments and consider the remarks that follow.

Amendments to the Claims:

Please amend claims 1, 3, 10, 12, 16, 22, 33, 43, and 44, cancel claims 21, 28, and 42 without prejudice, and add claims 45 and 46 as follows.

1. (currently amended): An apparatus for generating a strongly-ionized plasma in a chamber, the apparatus comprising:

an ionization source that generates a weakly-ionized plasma from a ~~volume of~~ feed gas, the weakly-ionized plasma reducing the probability of developing an electrical breakdown condition in the chamber;

a power supply that ~~applies~~ supplies power to the weakly-ionized plasma though an electrical pulse applied across the weakly-ionized plasma, the electrical pulse having a magnitude and a rise-time that is sufficient to increase the density of the weakly-ionized plasma to generate a strongly-ionized plasma; and

a gas line that supplies feed gas to ~~means for exchanging~~ the strongly-ionized plasma, the feed gas diffusing the strongly-ionized plasma, thereby allowing additional power from the pulsed power supply to be absorbed by the ~~with a second volume of feed gas applying the electrical pulse across the second volume of feed gas to generate an additional~~ strongly-ionized plasma.

2. (original): The apparatus of claim 1 wherein the power supply applies the electrical pulse across the weakly-ionized plasma to excite atoms in the weakly-ionized plasma and to generate secondary electrons, the secondary electrons ionizing the excited atoms, thereby creating the strongly-ionized plasma.

3. (currently amended): The apparatus of claim 1 ~~further comprising a~~ wherein the gas line supplies additional feed gas that ~~gas exchange means for~~ exchanges~~ing~~ the weakly-ionized plasma ~~with a third volume of feed gas~~ while applying the electrical pulse across ~~the third volume of feed gas~~.

4. (original): The apparatus of claim 1 wherein the power supply generates a constant power.

5. (original): The apparatus of claim 1 wherein the power supply generates a constant voltage.

6. (original): The apparatus of claim 1 wherein the ionization source is chosen from the group comprising an electrode coupled to a DC power supply, an electrode coupled to an AC power supply, a UV source, an X-ray source, an electron beam source, an ion beam source, an inductively coupled plasma source, a capacitively coupled plasma source, and a microwave plasma source.

7. (original): The apparatus of claim 1 further comprising a magnet that is positioned to generate a magnetic field proximate to the weakly-ionized plasma, the magnetic field trapping electrons in the weakly-ionized plasma.

8. (original): The apparatus of claim 7 wherein the magnet comprises an electro-magnet.

9. (original): The apparatus of claim 7 wherein the magnet is movable.

10. (currently amended): A method for generating a strongly-ionized plasma in a chamber, the method comprising:

ionizing a ~~volume of~~feed gas to form a weakly-ionized plasma that reduces the probability of developing an electrical breakdown condition in the chamber;

supplying power to the weakly-ionized plasma by applying an electrical pulse across the weakly-ionized plasma ~~to generate the~~, the electrical pulse having a magnitude and a rise-time that is sufficient to increase the density of the weakly-ionized plasma to generate a strongly-ionized plasma; and

diffusing the strongly-ionized plasma with additional feed gas thereby allowing ~~exchanging~~ the strongly-ionized plasma to absorb additional energy from the power supply ~~with a second volume of feed gas while applying the electrical pulse across the second volume of feed gas to generate an additional strongly-ionized plasma~~.

11. (original): The method of claim 10 wherein the applying the electrical pulse across the weakly-ionized plasma excites atoms in the weakly-ionized plasma and generates secondary electrons, the secondary electrons ionizing the excited atoms, thereby creating a strongly-ionized plasma.

12. (currently amended): The method of claim 10 further comprising exchanging the weakly-ionized plasma with additional feed gas ~~exchanging the weakly-ionized plasma with a third volume of feed gas while applying the electrical pulse across the third volume of feed gas~~.

13. (original): The method of claim 10 wherein the applying the electrical pulse comprises applying a quasi-static electric field across the weakly-ionized plasma.

14. (original): The method of claim 10 further comprising selecting at least one of a pulse amplitude and a pulse width of the electrical pulse in order to increase an ionization rate of the strongly-ionized plasma.

15. (original): The method of claim 10 further comprising selecting at least one of a pulse amplitude and a pulse width of the electrical pulse in order to cause the strongly-ionized plasma to be substantially uniform.

16. (currently amended): The method of claim 10 wherein the electrical pulse comprises a rise time that is less than about 100V/μsec. ~~between about 0.1 microsecond and 10 seconds.~~

17. (original): The method of claim 10 wherein the peak plasma density of the weakly-ionized plasma is less than about 10^{12} cm^{-3}.

18. (original): The method of claim 10 wherein the peak plasma density of the strongly-ionized plasma is greater than about 10^{12} cm^{-3}.

19. (original): The method of claim 10 wherein the ionizing the feed gas comprises exposing the feed gas to one of a static electric field, an pulsed electric field, UV radiation, X-ray radiation, electron beam radiation, and an ion beam.

20. (original): The method of claim 10 further comprising generating a magnetic field proximate to the weakly-ionized plasma, the magnetic field trapping electrons in the weakly-ionized plasma.

21. (canceled).

22. (currently amended): An apparatus for generating a strongly-ionized plasma, the apparatus comprising:

an anode;

a cathode that is positioned adjacent to the anode and forming a gap there between;

an ionization source that generates a weakly-ionized plasma proximate to the cathode, the weakly-ionized plasma reducing the probability of developing an electrical breakdown condition between the anode and the cathode; and

a power supply that produces an electric field across the gap, the electric field generating excited atoms in the weakly-ionized plasma and generating secondary electrons from the cathode, the secondary electrons ionizing the excited atoms, thereby creating the strongly-ionized plasma.

23. (original): The apparatus of claim 22 wherein the power supply generates a constant power.

24. (original): The apparatus of claim 22 wherein the power supply generates a constant voltage.

25. (original): The apparatus of claim 22 wherein the electric field comprises a quasi-static electric field.

26. (original): The apparatus of claim 22 wherein the electric field comprises a pulsed electric field.

DOCKET ALARM

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts

Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research

With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips

Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS
Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS
Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS
Sync your system to PACER to automate legal marketing.