

EXHIBIT G.02
U.S. Patent No. 7,808,184

References cited herein:

- U.S. Patent No. 7,808,184 (“‘184 Patent”)
- D.V. Mozgrin, *et al.*, High-Current Low-Pressure Quasi-Stationary Discharge in a Magnetic Field: Experimental Research, Plasma Physics Reports, Vol. 21, No. 5, 1995 (“Mozgrin”)
- A. A. Kudryavtsev, *et al.*, Ionization relaxation in a plasma produced by a pulsed inert-gas discharge, Sov. Phys. Tech. Phys. 28(1), January 1983 (“Kudryavtsev”)
- Leipold et al., High-electron density, atmospheric pressure air glow discharges, Power Modulator Symposium, 2002 and 2002 High-Voltage Workshop. Conference Record of the Twenty-Fifth International, June 2002 (“Leipold”)
- Dennis M. Manos & Daniel L. Flamm, Plasma Etching: An Introduction, Academic Press 1989 (“Manos”)
- Gudmundsson et al., Evolution of the electron energy distribution and plasma parameters in a pulsed magnetron discharge, Applied Physics Letters, 78(22) May 2001 (“Gudmundsson”)
- U.S. Pat. No. 6,413,382 (“Wang”)

Claims 3 and 13	Mozgrin in view of Kudryavtsev and Wang
1. A method of generating a strongly-ionized plasma, the method comprising:	<p>The combination of Mozgrin with Kudryavtsev discloses a method of generating a strongly-ionized plasma.</p> <p>‘184 Patent at 7:14-17 (“[S]trongly-ionized plasmas are generally plasmas having plasma densities that are greater than about 10^{12}-10^{13} cm⁻³.”)</p> <p>Mozgrin at 401, right col, ¶2 (“For pre-ionization ... the initial plasma density in the $10^9 - 10^{11}$ cm⁻³ range.”)</p> <p>Mozgrin at 409, left col, ¶ 4 (“The implementation of the high-current magnetron discharge (regime 2) in sputtering ... plasma density (exceeding 2×10^{13} cm⁻³.”)</p> <p>Mozgrin at 409, left col, ¶5 (“The high-current diffuse discharge (regime 3) is useful for producing large-volume uniform dense plasmas $n_i \cong 1.5 \times 10^{15}$ cm⁻³ ...”).</p>
a) supplying feed gas proximate to an anode and a cathode assembly; and	<p>The combination of Mozgrin with Kudryavtsev discloses supplying feed gas proximate to an anode and a cathode assembly.</p> <p>Mozgrin at Fig. 1</p>

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	<div data-bbox="456 247 1414 632"> <p>(a) Planar magnetron cross-section showing cathode (1), anode (2), and magnetic system (3) with electric field E and magnetic field B. (b) Shaped-electrode configuration showing curved cathode (1) and anode (2) with magnetic system (3) and electric field E.</p> </div> <p>Fig. 1. Discharge device configurations: (a) planar magnetron; (b) shaped-electrode configuration. (1) Cathode; (2) anode; (3) magnetic system.</p> <p>Mozgrin at 401, left col, ¶ 4 (“...the discharge gap which was filled up with either neutral or pre-ionized gas.”).</p> <p>Mozgrin at 400, right col, ¶ 3 (“We investigated the discharge regimes in various gas mixtures at $10^{-3} - 10$ torr...”).</p> <p>Mozgrin at 402, ¶ spanning left and right cols (“We studied the high-current discharge in wide ranges of discharge current...and operating pressure...using various gases (Ar, N₂, SF₆, and H₂) or their mixtures of various composition...”).</p> <p>Mozgrin at 401, left col, ¶ 1 (“The [plasma] discharge...was adjacent to the cathode.”)</p> <p><i>See also Mozgrin at Fig. 1.</i></p>
<p>b) generating a voltage pulse between the anode and the cathode assembly,</p>	<p>The combination of Mozgrin with Kudryavtsev discloses generating a voltage pulse between the anode and the cathode assembly.</p> <p>Mozgrin at Fig. 3:</p> <div data-bbox="456 1522 1057 1858"> <p>(b) Graph showing a voltage pulse between the anode and the cathode assembly. The pulse is a sharp rise followed by a decay. The x-axis is labeled with 1, 2a, 2b, and 3.</p> </div>

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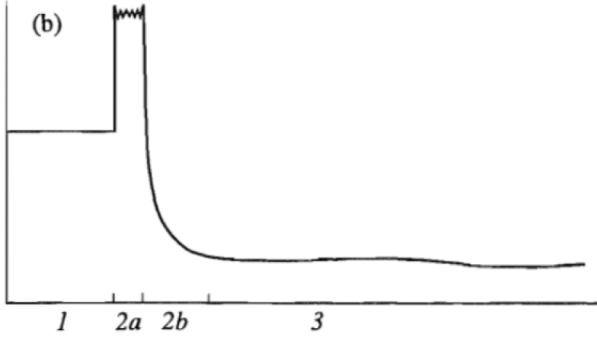
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	<p>Mozgrin at 402, Fig. 3 caption (“Fig. 3. Oscillograms of (a) current and (b) voltage...”).</p> <p>Mozgrin at 401, left col, ¶ 4 (“It was possible to form the high-current quasi-stationary regime by applying a square voltage pulse to the discharge gap which was filled up with either neutral or pre-ionized gas.”)</p>
the voltage pulse having at least one of a controlled amplitude and a controlled rise time	<p>The combination of Mozgrin with Kudryavtsev discloses the voltage pulse having at least one of a controlled amplitude and a controlled rise time.</p> <p>Mozgrin at Fig. 3:</p>  <p>Mozgrin at 401, right col, ¶ 1 (“[t]he power supply was able to deliver square voltage and current pulses with [rise] times (leading edge) of 5 – 60 μs ...”).</p> <p>Mozgrin at 406, right col, ¶ 2 (“Table 1 presents parameter ranges corresponding to regime 2.”).</p> <p>Mozgrin at 406, Table 1.</p>
that increases an ionization rate so that a rapid increase in electron density and a formation of a strongly-ionized plasma occurs	<p>The combination of Mozgrin with Kudryavtsev discloses [at least one of a controlled amplitude and a controlled rise time] that increases an ionization rate so that a rapid increase in electron density and a formation of a strongly-ionized plasma occurs without forming an arc between the anode and the cathode assembly.</p> <p>Mozgrin at Fig. 3</p> <p>Mozgrin at 401, right col, ¶ 2 (“For pre-ionization ... the initial plasma density in the $10^9 - 10^{11} \text{ cm}^{-3}$ range.”).</p> <p>Mozgrin at 409, left col, ¶ 4 (“The implementation of the high-current magnetron discharge (regime 2) in sputtering ... plasma density (exceeding $2 \times 10^{13} \text{ cm}^{-3}$”).</p>

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	<p>Mozgrin at 409, left col, ¶5 (“The high-current diffuse discharge (regime 3) is useful for producing large-volume uniform dense plasmas $n_i \cong 1.5 \times 10^{15} \text{ cm}^{-3} \dots$”).</p> <p>Mozgrin at Fig. 3</p> <p>Mozgrin at 401, ¶ spanning left and right columns (“The frequency parameters of the pulsed supply unit were chosen... Designing the [pulsed supply] unit, we took into account the dependencies which had been obtained in [Kudryavtsev] of ionization relaxation on pre-ionization parameters, pressure, and pulse voltage amplitude.”).</p> <p>Kudryavtsev at 32, right col, ¶¶ 5-6 (“The discharge occurred inside a cylindrical tube... The gas was preionized by applying a dc current... A voltage pulse... was applied to the tube.”).</p> <p>Kudryavtsev at 31, right col, ¶ 6 (“... an explosive increase in n_e [electron density]. The subsequent increase in n_e then reaches its maximum value, equal to the rate of excitation [equation omitted], which is several orders of magnitude greater than the ionization rate during the initial stage.”)</p> <p>Kudryavtsev at Abstract (“... electron density increases explosively in time due to accumulation of atoms in the lowest excited states.”)</p> <p>It would have been obvious to adjust the operating parameters, e.g., increase the pulse length and/or pressure, so as to trigger Kudryavtsev’s fast stage of ionization. One of ordinary skill would have been motivated to use Kudryavtsev’s fast stage of ionization in Mozgrin so as to increase plasma density and thereby increase the sputtering rate. Kudravrsev’s fast stage would also reduce the time required to reach a given plasma density in Mozgrin, thus reducing the time required for a sputtering process. Further, use of Kudryavtsev’s fast stage in Mozgrin would have been a combination of old elements in which each element performed as expected to yield predictable results. Finally, because Mozgrin’s pulse, or the pulse used in the combination of Mozgrin and Kudryavtsev, produced Kudryavtsev’s “explosive increase” in plasma density, the rise time and amplitude of the pulse result in increasing the ionization rate so that a rapid increase in electron density and formation of a strongly-ionized plasma occurs.</p> <p>It would have been obvious to one of ordinary skill to combine Mozgrin with Kudryavtsev at least because Mozgrin cites Kudryavtsev and because Mozgrin explicitly notes that it was designed in accordance with Kudryavtsev. Mozgrin at 401, ¶ spanning left and right columns (“Designing the [pulsed supply] unit, we took into account the dependences which had been obtained in [Kudryavtsev].”). Also, Kudryavtsev states,</p>

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	<p>“Since the effects studied in this work are characteristic of ionization whenever a field is suddenly applied to a weakly ionized gas, they must be allowed for when studying emission mechanisms in pulsed gas lasers, gas breakdown, laser sparks, etc.” Kudryavtsev at 34, right col, ¶ 4. Because Mozgrin applies voltage pulses that “suddenly generate an electric field,” one of ordinary skill reading Mozgrin would have been motivated to consider Kudryavtsev to better understand the effects of applying Mozgrin’s pulse and to confirm that Mozgrin’s system used Kudryavtsev’s fast stage of ionization. Further, use of Kudryavtsev’s fast stage in Mozgrin would have been a combination of old elements in which each element performed as expected.</p> <p><i>Background:</i> Leipold at Abstract (“Application of a high voltage pulse causes a shift in the electron energy distribution function to higher energies. This causes a temporary increase of the ionization rate and consequently an increase of the electron density.”)</p>
without forming an arc between the anode and the cathode assembly.	<p>The combination of Mozgrin with Kudryavtsev discloses without forming an arc between the anode and the cathode assembly.</p> <p>Mozgrin at Fig. 7.</p> <p>Mozgrin at 400, left col, ¶ 3 (“Some experiments on magnetron systems of various geometry showed that discharge regimes which do not transit to arcs can be obtained even at high currents.”).</p> <p>Mozgrin at 400, right col, ¶ 1 (“A further increase in the discharge currents caused the discharges to transit to the arc regimes...”).</p> <p>Mozgrin at 404, left col, ¶ 4 (“The parameters of the shaped-electrode discharge transit to regime 3, as well as the condition of its transit to arc regime 4, could be well determined for every given set of the discharge parameters.”).</p> <p>Mozgrin at 406, right col, ¶ 3 (“Moreover, pre-ionization was not necessary; however, in this case, the probability of discharge transferring to the arc mode increased.”).</p> <p>Mozgrin at 403, left col, ¶ 2 (“Then, we studied regimes 2 and 3 separately to determine the boundary parameters of their occurrence, such as current, voltage...”).</p> <p>Mozgrin at 400, right col, ¶ 1 (“A further increase in the discharge currents caused the discharges to transit to the arc regimes...”).</p>

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