EXHIBIT D.03
U.S. Patent No. 6,853,142

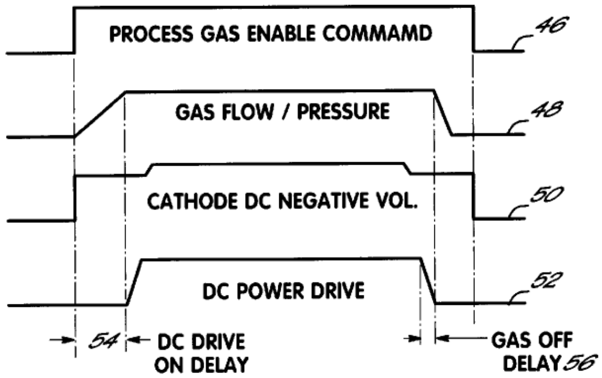
References cited herein:

- U.S. Pat. No. 6,853,142 ("'142 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")
- U.S. Pat. No. 6,190,512 ("Lantsman")
- Dennis M. Manos & Daniel L. Flamm, Plasma Etching: An Introduction, Academic Press 1989 ("Manos")
- Milton Ohring, The Material Science of Thin Films, Academic Press, 1992 ("Ohring")
- Donald L. Smith, Thin-Film Deposition: Principles & Practice, McGraw Hill, 1995 ("Smith")

'142 Claims 1, 3-9, 10, 12, 14, 15, 17-20, 40 and 42	Mozgrin in view of Lantsman
[1pre.] An apparatus for generating a strongly-ionized plasma in a chamber, the apparatus comprising:	The combination of Mozgrin and Lantsman discloses an apparatus for generating a strongly-ionized plasma in a chamber. '142 Patent at claim 18 ("wherein the peak plasma density of the strongly-ionized plasma is greater than about 10^{12} cm^{-3}") Mozgrin at Fig 1 Mozgrin at 400, right col, ¶ 4 ("To study the high-current forms of the discharge, we used two types of devices: a planar magnetron and a ystem with specifically shaped hollow electrodes.") Mozgrin at 401, right col, ¶2 ("For pre-ionization … the initial plasma density in the $10^9 – 10^{11}$ cm^{-3} range.") Mozgrin at 409, left col, ¶ 4 ("The implementation of the high-current magnetron discharge (regime 2) in sputtering … plasma density (exceeding $2x10^{13}$ cm^{-3}).") Mozgrin at 409, left col, ¶5 ("The high-current diffuse discharge (regime 3) is useful for producing large-volume uniform dense plasmas $n_i \cong 1.5x10^{15} cm^{-3}$…").

'142 Claims 1, 3-9, 10, 12, 14, 15, 17-20, 40 and 42	**Mozgrin in view of Lantsman**
[1a.] an ionization source that generates a weakly-ionized plasma from a feed gas, the weakly-ionized plasma reducing the probability of developing an electrical breakdown condition in the chamber;	The combination of Mozgrin and Lantsman discloses an ionization source that generates a weakly-ionized plasma from a feed gas, the weakly-ionized plasma reducing the probability of developing an electrical breakdown condition in the chamber. '142 Patent at 5:18-19 ("The weakly-ionized plasma is also referred to as a pre-ionized plasma.") '142 Patent at claim 17 ("wherein the peak plasma density of the ***weakly-ionized plasma is less than about*** 10^{12} ***cm***$^{-3}$") Mozgrin at Figs. 1, 2, 3, 6, 7 Mozgrin at 402, right col, ¶2 ("Figure 3 shows typical voltage and current oscillograms.… Part I in the voltage oscillogram represents the voltage of the stationary discharge (pre-ionization stage).") Mozgrin at 401, right col, ¶2 ("[f]or pre-ionization, we used a stationary magnetron discharge; … provided the initial plasma density in the $10^9 – 10^{11}$ cm^{-3} range.") Mozgrin at 400, right col, ¶ 3 ("We investigated the discharge regimes in ***various gas mixtures*** at $10^{-3} – 10$ torr…") 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,*** N_2, SF_6, ***and*** H_2***)*** or their mixtures of various composition…") Mozgrin at 401, left col, ¶ 1 ("The [plasma] discharge had an annular shape and was ***adjacent to the cathode***.") Mozgrin at 406, right col, ¶3 ("pre-ionization was not necessary; however, in this case, the probability of discharge transferring to arc mode increased.") 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

'142 Claims 1, 3-9, 10, 12, 14, 15, 17-20, 40 and 42	**Mozgrin in view of Lantsman**
	obtained even at high currents.") *<u>Background:</u>* Manos at 231 ("We shall … [include] information on unipolar ***arcs***. ***These are a problem***…") Manos at 237 ("***When such an arc occurs***, the metal object is melted at the arc spot. The metal is explosively released…. ***How does one prevent such an arc***? There are several methods…")
[1b.] a power supply that 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	The combination of Mozgrin and Lantsman discloses a power supply that 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. '142 Patent at 1:41-43 ("Magnetron sputtering systems use magnetic fields that are shaped to trap and to concentrate secondary electrons, which are produced by ion bombardment of the target surface.") '142 Patent at 1:37-40 ("The plasma is replenished by electron-ion pairs formed by the collision of neutral molecules with secondary electrons generated at the target surface.") Mozgrin at Figs. 1, 2, 3 Mozgrin at 402, right col, ¶ 2 ("Part 1 in the voltage oscillogram represents the voltage of the stationary discharge (pre-ionization stage).") Mozgrin at 401, right col, ¶ 1 ("Thus, the supply unit was made providing square voltage and current pulses with [rise] times (leading edge) of 5 – 60 µs…")
[1c.] a gas line that supplies feed gas to the strongly-ionized plasma, the feed gas diffusing the strongly-ionized plasma, thereby allowing	The combination of Mozgrin and Lantsman discloses a gas line that supplies feed gas to the strongly-ionized plasma, the feed gas diffusing the strongly-ionized plasma, thereby allowing additional power from the

'142 Claims 1, 3-9, 10, 12, 14, 15, 17-20, 40 and 42	Mozgrin in view of Lantsman
additional power from the pulsed power supply to be absorbed by the strongly-ionized plasma.	pulsed power supply to be absorbed by the strongly-ionized plasma. It would have been obvious to one of ordinary skill to continue to add the feed gas in Mozgrin during production of the strongly-ionized plasma (i.e., during either of regions 2 or 3). Such addition of the feed gas would have both diffused the strongly-ionized plasma and allowed additional power from Mozgrin's repeating voltage pulses to be absorbed by the strongly-ionized plasma. '142 Patent at 2:21-34 ("FIG. 1 illustrates a cross-sectional view of a known plasma generating apparatus 100…. A feed gas from feed gas source 109, such as an argon gas source, is introduced into the vacuum chamber 104 through a gas inlet 110. The gas flow is controlled by a valve 112.") Mozgrin at Figs. 1 and 3 Mozgrin at ¶ spanning pp. 403-404 ("The … repetition frequency was 10 Hz…."). Mozgrin at 401, left col, ¶ 4 ("[A]pplying a square voltage pulse to the discharge gap which was filled up with either neutral or pre-ionized gas.") Lantsman at Fig. 6  FIG. 6 Lantsman at 3:9-13 ("[A]t the beginning of processing,

'142 Claims 1, 3-9, 10, 12, 14, 15, 17-20, 40 and 42	Mozgrin in view of Lantsman
	this switch is closed and gas is introduced into the chamber. When the plasma process is completed, the gas flow is stopped….") Lantsman at 4:36-38 ("To end processing, primary supply 10 is disabled, reducing the plasma current and deposition on the wafer. Then, gas flow is terminated….") Lantsman at 5:39-42 ("Sometime thereafter, gas flow is initiated and the gas flow and pressure (trace 48) begin to ramp upwards toward normal processing levels.") Lantsman at 5:42-45 Lantsman at 2:48-51 ("This secondary power supply 'pre-ignites' the plasma so that when the primary power supply is applied, the system smoothly transitions to final plasma development and deposition.") It would have been obvious to one of ordinary skill to continue to apply the feed gas during Mozgrin's regions 1 and 2 as taught by Lantsman. Such a continuous introduction of feed gas balances gas withdrawn by the vacuum system (e.g., as shown in the drawings from Ohring and Smith, copied below) so as to maintain a desired pressure. One of ordinary skill would have been motivated to combine Mozgrin and Lantsman. Both Mozgrin and Lantsman are directed to sputtering using plasma. *See* Mozgrin at 409, left col, ¶ 4 ("The implementation of the high-current magnetron discharge (regime 2) in sputtering or layer-deposition technologies provides an enhancement in the flux of deposited materials and plasma density…."); *see also* Lantsman at 1:6-8 ("This invention relates to reduction of device damage in plasma processes, including DC (magnetron or non-magnetron) sputtering, and RF sputtering."). Both references also relate to sputtering systems that use two power supplies, one for pre-ionization and one for deposition. *See* Lantsman at 4:45-47 ("[T]he secondary [power] supply 32 is used to pre-ignite the plasma,

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