EXHIBIT C.03
U.S. Patent No. 7,811,421

References cited herein:

- U.S. Pat. No. 7,811,421 ("'421 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")
- 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")

'421 Claims 9, 12, 13, and 35	Mozgrin in view of Kudryavtsev
[1pre]. A sputtering source comprising:	Mozgrin discloses a sputtering source. Mozgrin 403, right col, ¶4 ("Regime 2 was characterized by intense cathode sputtering…")
[1a] a) a cathode assembly comprising a sputtering target that is positioned adjacent to an anode; and	Mozgrin discloses a cathode assembly comprising a sputtering target that is positioned adjacent to an anode. '421 Patent at 3:39-4:2 ("FIG. 1 illustrates a cross-sectional view of a known magnetron sputtering apparatus 100 having a pulsed power source 102. … The magnetron sputtering apparatus 100 also includes a cathode assembly 114 having a target 116. … An anode 130 is positioned in the vacuum chamber 104 proximate to the cathode assembly 114.") Mozgrin at Fig. 1 Mozgrin at 403, right col., ¶4 ("Regime 2 was characterized by an intense cathode sputtering….") Mozgrin at 403, right col, ¶ 4 ("…The pulsed deposition rate of the cathode material…")
[1b] b) a power supply that generates a voltage pulse between the anode and the cathode assembly that creates a weakly-ionized plasma and then a	Mozgrin discloses a power supply that generates a voltage pulse between the anode and the cathode assembly that creates a weakly-ionized plasma and then a strongly-ionized plasma from the weakly-ionized plasma without an occurrence of arcing between the anode and the

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strongly-ionized plasma from the weakly-ionized plasma without an occurrence of arcing between the anode and the cathode assembly, an amplitude, a duration and a rise time of the voltage pulse being chosen to increase a density of ions in the strongly-ionized plasma.	cathode assembly, an amplitude, a duration and a rise time of the voltage pulse being chosen to increase a density of ions in the strongly-ionized plasma. '421 Patent at Fig. 6 '421 Patent at 8:22-23 ("The weakly-ionized plasma is also referred to as a pre-ionized plasma.") Mozgrin at Figs. 2 and 3 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.") 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 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 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.") Mozgrin at Fig. 7 Mozgrin explicitly notes that arcs can be avoided. See 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.") Mozgrin at 400, right col, ¶ 1 ("A further increase in the discharge currents caused the discharges to transit to the arc regimes…")

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	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.") 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.") Mozgrin at 404, left col, ¶ 2 ("[t]he density turned out to be about 3 x 10^{12} cm^{-3} in the regime of I_d = 60A and U_d = 900 V.") Mozgrin at 403 left col, ¶ 4 ("[t]ransferring to regime 3, the discharge occupied a significantly larger cathode surface than in the stationary regime.") Mozgrin at 404, right col, ¶ 2 ("The density ranged from (2 – 2.5) x 10^{14} cm^{-3} at 360 - 540A current up to (1-1.5) x 10^{15} cm^{-3} at 1100-1400 A current.") *Background:* Manos at 231 ("…arcs… are a problem…")
9. The sputtering source of claim 1 wherein the voltage pulse generated between the anode and the cathode assembly excites atoms in the weakly-ionized plasma and generates secondary electrons from the cathode assembly, the secondary electrons ionizing a portion of the excited atoms, thereby creating the strongly-ionized plasma.	The combination of Mozgrin and Kudryavtsev discloses the voltage pulse generated between the anode and the cathode assembly excites atoms in the weakly-ionized plasma and generates secondary electrons from the cathode assembly, the secondary electrons ionizing a portion of the excited atoms, thereby creating the strongly-ionized plasma. *See* evidence cited in claim 1 '421 Patent at 1:44-46 ("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.") '421 Patent at 1:41-43 ("The plasma is replenished by electron-ion pairs formed by the collision of neutral molecules with secondary electrons generated at the target surface.")

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	Mozgrin at 401, ¶ spanning left and right columns ("[d]esigning the [pulsed supply] unit, we took into account the dependences which had been obtained in [Kudryavtsev] of ionization relaxation on pre-ionization parameters, pressure, and pulse voltage amplitude.") 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 403, right col, ¶4 ("Regime 2 was characterized by intense cathode sputtering due to both high energy and density of ion flow.") Kudryavtsev at 34, right col, ¶ 4 ("[s]ince 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 Figs. 1 and 6 Kudryavtsev at 31, right col, ¶ 7 ("The behavior of the increase in n_e with time thus enables us to arbitrarily divide the ionization process into two stages, which we will call the slow and fast growth stages. Fig. 1 illustrates the relationships between the main electron currents in terms of the atomic energy levels during the slow and fast stages.") Kudryavtsev at 31, right col, ¶ 6 ("For nearly stationary n_2 [excited atom density] values … there is an explosive increase in n_e [plasma 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.") Kudryavtsev at Abstract ("in a pulsed inert-gas discharge plasma at moderate pressures… [i]t is shown that the electron density increases explosively in time due to

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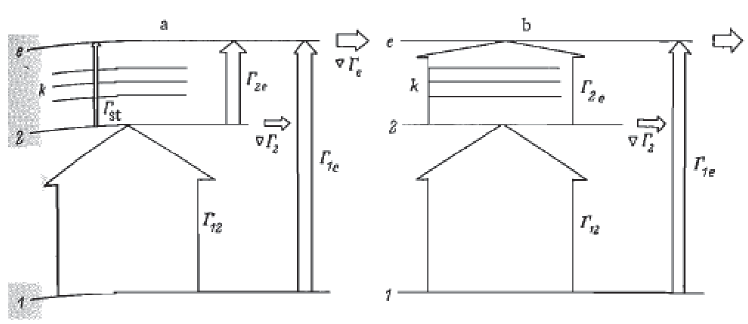
	accumulation of atoms in the lowest excited states.") Kudryavtsev at 30, Equation 1 Kudryavtsev at 30, right col, last ¶ ("…n_2, and n_e are the atomic densities in the …first excited states and the electron density, respectively;… β_{2e} [is] the rate coefficient[]…") If one of ordinary skill building a system according to Mozgrin did not experience Kudryavtsev's "explosive increase" in plasma density, 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. Further, use of Kudryavtsev's fast stage in Mozgrin would have been a combination of old elements that in which each element performed as expected to yield predictable results. The arrows Γ_{12} in Kudryavtsev's Fig. 1 show that excited atoms are produced in both Kudryavtsev's slow and fast stages. Therefore, in the combination of Mozgrin and Kudryavtsev, excited atoms are produced in the weakly-ionized plasma.  *<u>Background:</u>* Ohring at 104 ("Microscopically, positive gas ions in the discharge strike the cathode plate and eject neutral target atoms…. In addition, other particles (secondary electrons, desorbed gases, and negative ions) … are emitted from

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