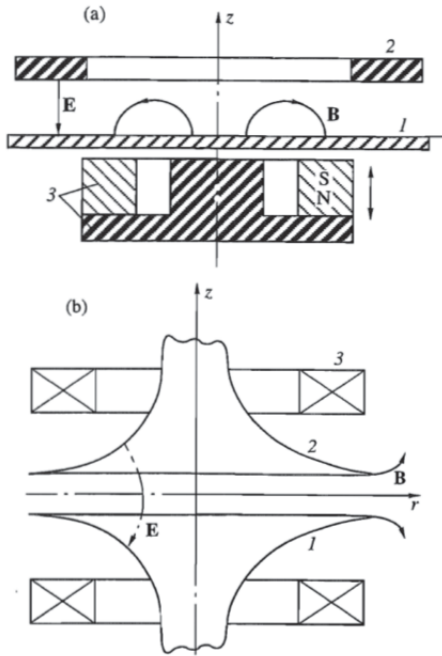


**EXHIBIT A.04**  
**U.S. Patent No. 7,147,759**

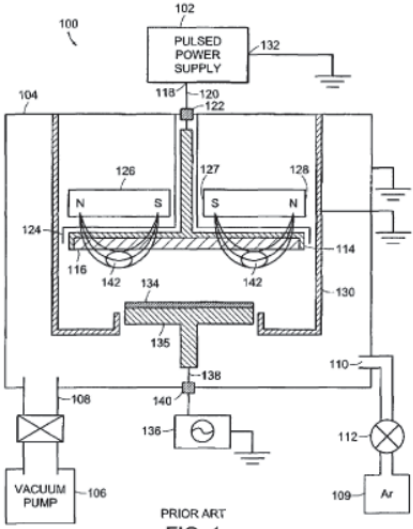
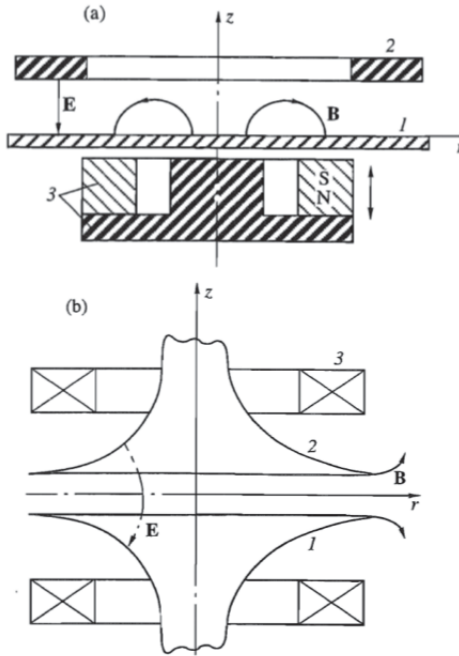
References cited herein:

- U.S. Patent No. 7,147,759 (“‘759 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”)
- U.S. Pat. No. 5,247,531 (“Muller-Horsche”)

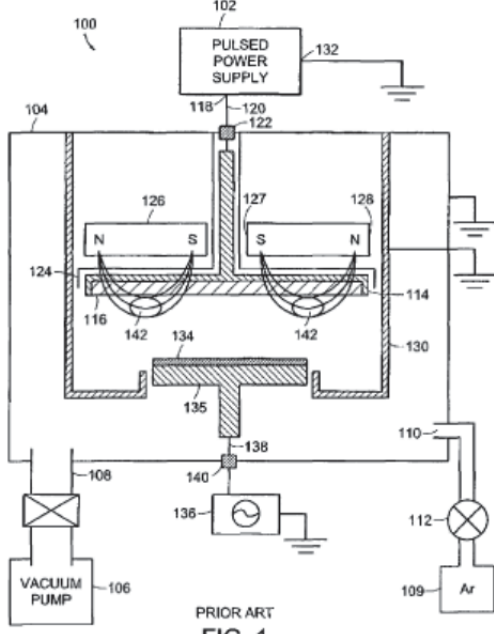
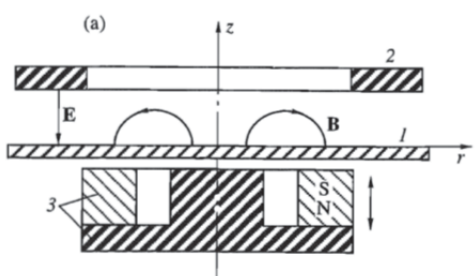
Claims 17 and 39	Mozgrin in view of Kudryavtsev and Muller-Horsche
<p>[1pre.] A magnetically enhanced sputtering source comprising:</p>	<p>The combination of Mozgrin with Kudryavtsev discloses a magnetically enhanced sputtering source.</p> <p>Mozgrin 403, right col, ¶4 (“Regime 2 was characterized by intense cathode sputtering...”)</p> <p>Mozgrin at Fig. 1</p>  <p style="text-align: center;"><b>Fig. 1.</b> Discharge device configurations: (a) planar magnetron; (b) shaped-electrode configuration. (1) Cathode; (2) anode; (3) magnetic system.</p>
<p>[1a.] an anode;</p>	<p>The combination of Mozgrin with Kudryavtsev discloses an anode.</p> <p>‘759 Patent at Fig. 1</p>

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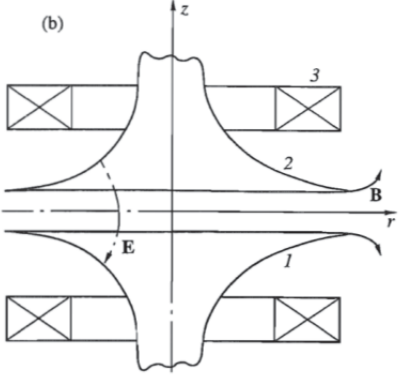
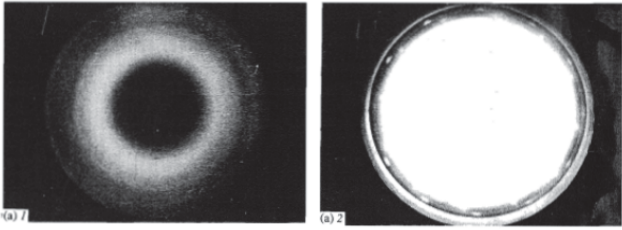
**EXHIBIT A.04**  
**U.S. Patent No. 7,147,759**

Claims 17 and 39	Mozgrin in view of Kudryavtsev and Muller-Horsche
	 <p>FIG. 1 illustrates a cross-sectional view of a known magnetron sputtering apparatus having a pulsed power source. The apparatus includes a vacuum chamber 104 containing a cathode assembly 114 with two cathodes 126 and 127, and an anode 130. A pulsed power supply 102 is connected to the cathodes. A vacuum pump 106 and an argon gas source 109 are also shown. The diagram is labeled "PRIOR ART FIG. 1".</p> <p>‘759 Patent at Fig. 1 (“FIG. 1 illustrates a cross-sectional view of a known magnetron sputtering apparatus having a pulsed power source.”)</p> <p>‘759 Patent at 3:40-41 (“an anode 130 is positioned in the vacuum chamber 104 proximate to the cathode assembly.”)</p> <p>Mozgrin at Fig. 1</p>  <p>Fig. 1. Discharge device configurations: (a) planar magnetron; (b) shaped-electrode configuration. (1) Cathode; (2) anode; (3) magnetic system.</p>
[1b.] a cathode	The combination of Mozgrin with Kudryavtsev discloses a cathode

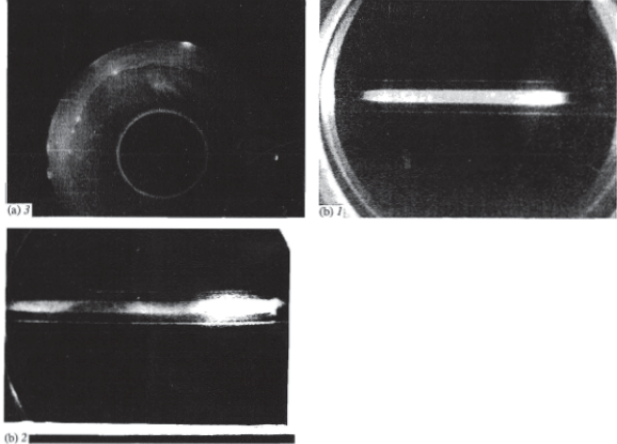
**EXHIBIT A.04**  
**U.S. Patent No. 7,147,759**

Claims 17 and 39	Mozgrin in view of Kudryavtsev and Muller-Horsche
<p>assembly that is positioned adjacent to the anode, the cathode assembly including a sputtering target;</p>	<p>assembly that is positioned adjacent to the anode, the cathode assembly including a sputtering target.</p> <p>‘759 Patent at Fig. 1</p>  <p>‘759 Patent at 3:10-12 (“FIG. 1 illustrates a cross-sectional view of a known magnetron sputtering apparatus having a pulsed power source.”)</p> <p>‘759 Patent at 3:23-24 (“magnetron sputtering apparatus 100 also includes a cathode assembly 114 having a target material 116.”)</p> <p>Mozgrin at 403, right col, ¶ 4 (“Regime 2 was characterized by intense cathode sputtering...”).</p> <p>Mozgrin at 403, right col, ¶ 4 (“...The pulsed deposition rate of the cathode material...”).</p> <p>Mozgrin at Fig. 1</p> 

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Claims 17 and 39	Mozgrin in view of Kudryavtsev and Muller-Horsche
	 <p><b>Fig. 1.</b> Discharge device configurations: (a) planar magnetron; (b) shaped-electrode configuration. (1) Cathode; (2) anode; (3) magnetic system.</p>
<p>[1c.] an ionization source that generates a weakly-ionized plasma proximate to the anode and the cathode assembly;</p>	<p>The combination of Mozgrin with Kudryavtsev discloses an ionization source that generates a weakly-ionized plasma proximate to the anode and the cathode assembly.</p> <p>‘759 Patent at 6:30-32 (“The weakly-ionized plasma is also referred to as a pre-ionized plasma.”)</p> <p>‘759 Patent at claim 32 (“wherein the peak plasma density of the weakly-ionized plasma is less than about <math>10^{12}</math> cm<sup>-3</sup>”).</p> <p>Mozgrin at 401, right col, ¶2 (“For pre-ionization, we used a stationary magnetron discharge; the discharge current ranged up to 300 mA.... We found out that only the regimes with magnetic field strength not lower than 400 G provided the initial plasma density in the <math>10^9 - 10^{11}</math> cm<sup>-3</sup> range.”). (emphasis added).</p> <p>Mozgrin at 401, left col, ¶ 1 (“The [plasma] discharge had an annular shape and was adjacent to the cathode.”). (emphasis added)</p> <p>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).”).</p> <p>Mozgrin at Fig. 6</p> 

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Claims 17 and 39	Mozgrin in view of Kudryavtsev and Muller-Horsche
	 <p><b>Fig. 6.</b> High-current quasi-stationary discharge regimes. (a) planar magnetron: (1) high-current magnetron regime (<math>p = 10^{-1}</math> torr, Ar, <math>I_d = 70</math> A, <math>U_d = 900</math> V); (2) high-current diffuse regime (<math>p = 10^{-1}</math> torr, Ar, <math>I_d = 700</math> A, <math>U_d = 80</math> V); (3) arc regime (<math>p = 10^{-1}</math> torr, Ar, <math>I_d = 1000</math> A, <math>U_d = 45</math> V). (b) Shaped-electrode system: (1) high-current diffuse regime (<math>p = 10^{-1}</math> torr, Ar, <math>I_d = 1000</math> A, <math>U_d = 80</math> V); (2) contracted arc regime (<math>p = 10^{-1}</math> torr, Ar, <math>I_d = 1500</math> A, <math>U_d = 50</math> V).</p>
<p>[1d.] a magnet that is positioned to generate a magnetic field proximate to the weakly-ionized plasma, the magnetic field substantially trapping electrons in the weakly-ionized plasma proximate to the sputtering target; and</p>	<p>The combination of Mozgrin with Kudryavtsev discloses a magnet that is positioned to generate a magnetic field proximate to the weakly-ionized plasma, the magnetic field substantially trapping electrons in the weakly-ionized plasma proximate to the sputtering target.</p> <p>‘759 Patent at 3:10-12 (“FIG. 1 shows a cross-sectional view of a known magnetron sputtering apparatus 100...” that has a magnet 126.”)</p> <p>‘759 Patent at 4:4-10 [<i>describing the prior art Fig. 1</i>] (“The electrons, which cause ionization, are generally confined by the magnetic fields produced by the magnet 126. The magnetic confinement is strongest in a confinement region 142....”)</p> <p>Mozgrin at 401, left col, ¶ 1 (“The electrodes were immersed in a magnetic field of annular permanent magnets.”).</p> <p>Mozgrin at 401, right col, ¶ 2 (“We found out that only the regimes with magnetic field strength not lower than 400 G provided the initial plasma density in the <math>10^9</math>-<math>10^{11}</math> cm<sup>-3</sup> range.”).</p> <p>Mozgrin at 407, left col, ¶ 3 (“The action of the magnetic field serves only to limit the electron thermal conductivity and to provide collisions sufficient for efficient energy transfer from electrons to heavy particles.”).</p> <p>Mozgrin at Fig. 1</p>

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