

**UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C. 20436**

**Before the Honorable Bryan F. Moore
Administrative Law Judge**

In the Matter of

**CERTAIN SENSORS WITH PIXELS AND
PRODUCTS CONTAINING THE SAME**

Investigation No. 337-TA-1403

**OPENING EXPERT REPORT OF DR. ADAM FONTECCHIO
REGARDING UNITED STATES PATENT NO. 11,069,737
(January 31, 2025)**

Contents

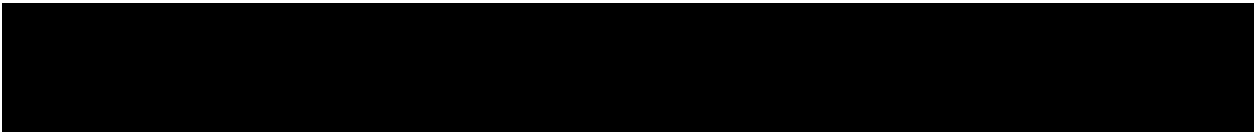
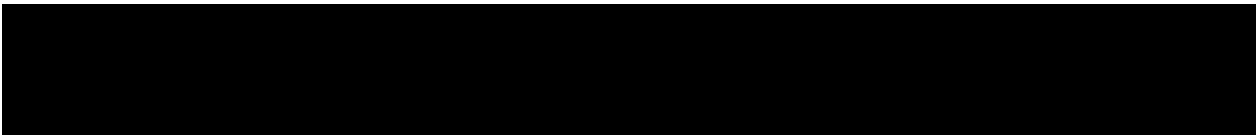
1	Background and Qualifications.....	2
2	Legal Standards.....	5
2.1	Priority Date.....	5
2.2	Anticipation.....	6
2.3	Obviousness	7
2.4	Written Description and Enablement.....	12
2.5	Indefiniteness	13
2.6	Noninfringement	13
3	Background of the Technology.....	15
3.1	Image sensors.....	15
3.2	Photodiodes.....	16
3.3	Quantum efficiency.....	17
3.4	Textured regions in photodiodes.....	18
3.4.1	The alleged inventor’s knowledge of prior art featuring a textured region	18
3.4.2	Prior art references disclosed positioning a textured region on the light incident side.....	22
3.4.3	SiOnyx itself disclosed positioning a textured region on the light incident side	25
3.4.4	Harvard “black silicon”	27
3.5	Front side illuminated (FSI) and backside illuminated (BSI) configurations.....	32
4	The ’737 Patent	34
4.1	Overview.....	34

4.2	Prosecution History.....	37
4.3	SiOnyx’s Disclaimer of Most Claims of the ’737 Patent	38
4.4	Priority Date.....	39
4.5	Level of Ordinary Skill in the Art.....	40
4.6	Claim Construction.....	40
5	Overview of the Prior Art	42
5.1	U.S. Patent Application Publication No. 2012/0068289 (“Alie”) (PRIORART-ITC1403-00002901).....	42
5.2	U.S. Patent Application Publication No. 2006/0081900 (“Baggenstoss”) (PRIORART-ITC1403-00002922).....	44
5.3	International Publication No. WO 2012/122572 (“Jiang”) (PRIORART-ITC1403-00004869)	45
5.4	U.S. Patent Application Publication No. 2011/0227138 (“Haddad138”) (PRIORART-ITC1403-00003042).....	46
5.5	U.S. Patent Application Publication No. 2012/0146172 (“Carey”) (PRIORART-ITC1403-00003705).....	49
5.6	U.S. Patent Application Publication No. 2010/0006969 (“Park”) (PRIORART-ITC1403-00003003).....	50
6	Summary of Opinions.....	52
7	The Asserted Claims of the ’737 Patent Are Invalid Based on Alie Alone or in Combination with Baggenstoss or Jiang.....	53
7.1	Alie anticipates, or at a minimum renders obvious, claims 2-6, 33, and 35-36.....	54
7.1.1	Claim 1.....	54
7.1.2	Claim 2: “The device of claim 1, wherein the textured region is located on the light incident side of the semiconductor layer.”	62
7.1.3	Claim 3: “The device of claim 2, further comprising a device layer coupled to the semiconductor layer on said side opposed to the light incident side.”	71

7.1.4	Claim 4: “The device of claim 2, wherein the textured region is formed by etching.”	74
7.1.5	Claim 5: “The device of claim 4, wherein said surface features comprise pyramids.”	74
7.1.6	Claim 6: “The device of claim 2, further comprising a reflector layer disposed between the textured layer and the support substrate.”	75
7.1.7	Claim 32.....	79
7.1.8	Claim 33: “The device of claim 32, wherein the textured region is located on the light incident side of the semiconductor layer.”	87
7.1.9	Claim 35: “The device of claim 33, wherein the textured region is formed by etching.”	87
7.1.10	Claim 36: “The device of claim 35, wherein said surface features comprise pyramids.”	88
7.2	Alie in view of Baggenstoss renders obvious claims 2-6	88
7.2.1	The combination of Alie and Baggenstoss	88
7.2.2	Claims 2-6.....	90
7.3	Alie in view of Jiang renders obvious claims 33 and 35-36	93
8	The Asserted Claims of the '737 Patent Are Invalid Based on Haddad138 Alone or in Combination with Baggenstoss or Jiang.....	93
8.1	Haddad138 anticipates, or at a minimum renders obvious, claims 2-6, 33, and 35-36	93
8.1.1	Claim 1.....	93
8.1.2	Claim 2: “The device of claim 1, wherein the textured region is located on the light incident side of the semiconductor layer.”	103
8.1.3	Claim 3: “The device of claim 2, further comprising a device layer coupled to the semiconductor layer on said side opposed to the light incident side.”	110
8.1.4	Claim 4: “The device of claim 2, wherein the textured region is formed by etching.”	112
8.1.5	Claim 5: “The device of claim 4, wherein said surface features comprise pyramids.”	112

8.1.6	Claim 6: “The device of claim 2, further comprising a reflector layer disposed between the textured layer and the support substrate.”	112
8.1.7	Claim 32.....	119
8.1.8	Claim 33: “The device of claim 32, wherein the textured region is located on the light incident side of the semiconductor layer.”	128
8.1.9	Claim 35: “The device of claim 33, wherein the textured region is formed by etching.”	128
8.1.10	Claim 36: “The device of claim 35, wherein said surface features comprise pyramids.”	128
8.2	Haddad138 in view of Baggenstoss renders obvious claims 2-6.....	129
8.2.1	The combination of Haddad138 and Baggenstoss	129
8.2.2	Claims 2-6.....	131
8.3	Haddad138 in view of Jiang renders obvious claims 33 and 35-36	133
9	The Asserted Claims of the '737 Patent Are Invalid Based on Carey Alone or in Combination with Baggenstoss, Alie, or Jiang.....	134
9.1	Carey anticipates, or at a minimum renders obvious, claims 2-6, 33, and 35-36.....	134
9.1.1	Claim 1.....	134
9.1.2	Claim 2: “The device of claim 1, wherein the textured region is located on the light incident side of the semiconductor layer.”	144
9.1.3	Claim 3: “The device of claim 2, further comprising a device layer coupled to the semiconductor layer on said side opposed to the light incident side.”	145
9.1.4	Claim 4: “The device of claim 2, wherein the textured region is formed by etching.”	148
9.1.5	Claim 5: “The device of claim 4, wherein said surface features comprise pyramids.”	149
9.1.6	Claim 6: “The device of claim 2, further comprising a reflector layer disposed between the textured layer and the support substrate.”	149
9.1.7	Claim 32.....	153

9.1.8	Claim 33: “The device of claim 32, wherein the textured region is located on the light incident side of the semiconductor layer.”	161
9.1.9	Claim 35: “The device of claim 33, wherein the textured region is formed by etching.”	161
9.1.10	Claim 36: “The device of claim 35, wherein said surface features comprise pyramids.”	161
9.2	Carey in view of Baggenstoss renders obvious claims 2-6.....	162
9.2.1	The combination of Carey and Baggenstoss.....	162
9.2.2	Claims 2-6.....	164
9.3	Carey in view of Alie renders obvious claims 2-6.....	166
9.3.1	Claims 2-6.....	166
9.3.2	Claim 6: “The device of claim 2, further comprising a reflector layer disposed between the textured layer and the support substrate.”.....	170
9.4	Carey in view of Jiang renders obvious claims 33 and 35-36	174
10	Claims 2-4, 6, 33, and 35 of the ’737 Patent Are Invalid Based on Park Alone, or in Combination with Baggenstoss or Jiang.....	174
10.1	Park anticipates, or at a minimum renders obvious, claims 2-4, 6, 33, and 35.....	175
10.1.1	Claim 1.....	175
10.1.2	Claim 2: “The device of claim 1, wherein the textured region is located on the light incident side of the semiconductor layer.”	186
10.1.3	Claim 3: “The device of claim 2, further comprising a device layer coupled to the semiconductor layer on said side opposed to the light incident side.”	187
10.1.4	Claim 4: “The device of claim 2, wherein the textured region is formed by etching.”	189
10.1.5	Claim 6: “The device of claim 2, further comprising a reflector layer disposed between the textured layer and the support substrate.”.....	189
10.1.6	Claim 32.....	191

	
	
	
10.1.7	Claim 33: “The device of claim 32, wherein the textured region is located on the light incident side of the semiconductor layer.” 198
10.1.8	Claim 35: “The device of claim 33, wherein the textured region is formed by etching.” 198
10.2	Park in view of Baggenstoss renders obvious claims 2-4 and 6 198
10.2.1	The combination of Park and Baggenstoss 198
10.2.2	Claims 2-4 and 6 201
10.3	Park in view of Jiang renders obvious claims 33 and 35 204
11	Written Description and Enablement 204
12	Indefiniteness 206
13	Secondary Considerations of Non-Obviousness 208
14	Non-Infringement of Unaccused Sensors and Products 218
	
14.2	Non-Infringement Analysis of Unaccused Sensors and Products 224
	
14.2.3	Conclusion 247
15	Conclusion 247