



US006971939B2

(12) **United States Patent**  
**Claus et al.**

(10) **Patent No.:** **US 6,971,939 B2**  
(45) **Date of Patent:** **Dec. 6, 2005**

(54) **NON-OXIDIZING ELECTRODE  
ARRANGEMENT FOR EXCIMER LAMPS**

(75) Inventors: **Holger Claus**, Lake Forest, CA (US);  
**Zoran Falkenstein**, Rancho St.  
Margarita, CA (US)

(73) Assignee: **Ushio America, Inc.**, Irvine, CA (US)

(\* ) Notice: Subject to any disclaimer, the term of this  
patent is extended or adjusted under 35  
U.S.C. 154(b) by 0 days.

5,214,344 A *	5/1993	Kogelschatz .....	313/17
5,343,114 A *	8/1994	Beneking et al. ....	313/485
5,397,259 A *	3/1995	Zaslavsky et al. ....	445/29
5,581,152 A *	12/1996	Matsuno et al. ....	313/634
5,763,999 A *	6/1998	Matsuno et al. ....	313/573
5,849,107 A *	12/1998	Itoyama et al. ....	136/248
5,993,278 A *	11/1999	Falkenstein .....	445/26
6,525,451 B1 *	2/2003	Hishinuma et al. ....	313/234
6,633,109 B2 *	10/2003	Falkenstein .....	313/29
6,634,917 B1 *	10/2003	Kling et al. ....	445/25
6,747,419 B2 *	6/2004	Claus et al. ....	315/248
6,762,556 B2 *	7/2004	Winsor .....	313/607

\* cited by examiner

(21) Appl. No.: **10/857,069**

(22) Filed: **May 28, 2004**

(65) **Prior Publication Data**

US 2004/0263043 A1 Dec. 30, 2004

**Related U.S. Application Data**

(60) Provisional application No. 60/474,010, filed on May  
29, 2003.

(51) **Int. Cl.**<sup>7</sup> ..... **H01J 17/16**

(52) **U.S. Cl.** ..... **445/46; 445/48**

(58) **Field of Search** ..... 445/46, 48, 53,  
445/56, 35, 26, 27; 313/594, 607

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

4,837,484 A \* 6/1989 Eliasson et al. .... 313/634

*Primary Examiner*—Joseph Williams

*Assistant Examiner*—Dalei Dong

(74) *Attorney, Agent, or Firm*—Bradley D. Blanche;  
Greenberg Traurig LLP

(57) **ABSTRACT**

A non-oxidizing electrode arrangement for an excimer lamp that is formed by coating an electrode of the lamp with a layer of protective layer that prevents the electrode from oxidizing. The protective layer is preferably transparent and possesses a low permeability for oxygen (e.g., silicon oxide, magnesium fluoride, calcium fluoride). The interior of the excimer lamp is evacuated to a pressure level that is lower than the pressure level surrounding the excimer lamp at any time during the non-oxidizing electrode formation process in order to assist in preventing the excimer lamp from fracturing.

**12 Claims, 6 Drawing Sheets**

