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Tavkhelidze

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(54) **METHOD FOR FABRICATION OF SEPARATORS FOR ELECTRODE PAIRS IN DIODES**

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(52) **U.S. Cl.** **174/261**; 361/767; 361/773

(58) **Field of Classification Search** 174/261; 361/773-774, 767-771

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,740,592 A 6/1973 Engdahl et al.
3,816,173 A 6/1974 Eldridge et al.
3,999,203 A 12/1976 Lahiri

4,011,582 A 3/1977 Cline et al.
4,063,965 A 12/1977 Cline et al.
4,145,699 A 3/1979 Hu et al.
5,307,561 A * 5/1994 Feigenbaum et al. 29/846
5,336,547 A 8/1994 Kawakita et al.
5,744,759 A * 4/1998 Ameen et al. 174/260
5,917,156 A 6/1999 Nobori et al.
6,214,651 B1 4/2001 Cox
6,225,205 B1 5/2001 Kinoshita
6,246,587 B1 * 6/2001 Chen 361/773
6,417,060 B2 7/2002 Tavkhelidze et al.
2001/0046749 A1 11/2001 Tavkhelidze et al.
2002/0170172 A1 11/2002 Tavkhelidze et al.
2006/0118330 A1 * 6/2006 Ooyabu et al. 174/261

FOREIGN PATENT DOCUMENTS

WO WO 99/13562 A1 3/1999

* cited by examiner

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(57) **ABSTRACT**

An improved method for manufacturing a matching pair of electrodes comprises the steps of: fabricating a first electrode with a substantially flat surface; depositing islands of an oxidizable material over regions of the surface; depositing a layer of a third material over the surface of the first electrode to form a second electrode; separating the first electrode from the second electrode; oxidizing the islands of oxidizable material, which causes the islands to expand; bringing the upper electrode and the lower electrode into close proximity, whereupon the expanded island of oxidizable material touches the upper surface and creates an insulating gap between the two surfaces, thereby forming a matching pair of electrodes.

8 Claims, 1 Drawing Sheet

