US005639914A

United States Patent [19]

Tomiyama et al.

[11] Patent Number: 5,639,914

[45] Date of Patent: Jun. 17, 1997

[54] **TETRAARYL BENZIDINES**

[75] Inventors: **Hiromitsu Tomiyama**; **Masahiko Oshino**; **Ikuko Ihara**; **Naoko Nakanishi**, all of Ibaraki, Japan

[73] Assignees: **Hodogaya Chemical Co., Ltd.**, Tokyo; **Matsushita Electric Industrial Co., Ltd.**, Kadoma, both of Japan

[21] Appl. No.: **332,726**

[22] Filed: **Nov. 1, 1994**

[30] **Foreign Application Priority Data**

Nov. 1, 1993	[JP]	Japan	5-273883
Nov. 1, 1993	[JP]	Japan	5-293800
Nov. 1, 1993	[JP]	Japan	5-293801
Jun. 15, 1994	[JP]	Japan	6-132744
Jun. 15, 1994	[JP]	Japan	6-155470
Sep. 30, 1994	[JP]	Japan	6-236622
Sep. 30, 1994	[JP]	Japan	6-259688

[51] **Int. Cl.**[6] **C07C 211/55**

[52] **U.S. Cl.** **564/309**; 552/110; 564/50

[58] **Field of Search** 552/110; 564/50, 564/309

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,588,666	5/1986	Stolka et al.	430/59
4,720,432	1/1988	Vanslyke et al.	428/457
4,833,054	5/1989	Akasaki et al.	430/59
5,482,822	1/1996	Mihara et al.	430/270.14

FOREIGN PATENT DOCUMENTS

5-239455	9/1993	Japan .	
6-199745	7/1994	Japan	564/309

OTHER PUBLICATIONS

Appl. Phys. Lett. vol. 51, No. 12, Sep. 21, 1987, C.W. Tang, et al., "Organic Electroluminescent Diodes", pp. 913–915.

Database WPI, Derwent Publications Ltd. AN 91–187965, JP–A–2 234 394, Sep. 17, 1990.

Nakaya et al., Chemical Abstracts, vol. 123, abstract 270294.

Primary Examiner—Richard L. Raymond

Attorney, Agent, or Firm—Oblon, Spivak, McClelland, Maier & Neustadt, P.C.

[57] **ABSTRACT**

The present invention provides novel amine compounds useful as electron-transporting materials to be incorporated in organic electro-luminescence devices. More particularly, the present invention provides an organic electro-luminescence device (organic EL device) which can find wide application in various display units, requires a low applied voltage and exhibits a high luminance and an excellent stability.

6 Claims, 10 Drawing Sheets