

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

(10) **Patent No.:** **US 9,410,236 B2**
(45) **Date of Patent:** **Aug. 9, 2016**

(54) **SPUTTERING APPARATUS AND METHOD**

(2013.01); *C23C 14/3492* (2013.01); *C23C 14/56* (2013.01); *H01J 37/32651* (2013.01)

(71) Applicant: **TSMC Solar Ltd.**, Taichung (TW)

(58) **Field of Classification Search**

CPC *H01J 37/32651*; *C23C 14/3492*
See application file for complete search history.

(72) Inventors: **Wen-Tsai Yen**, Caotun Township (TW);
Chung-Hsien Wu, Luzhu Township (TW);
Shih-Wei Chen, Kaohsiung (TW);
Ying-Hsin Wu, Taichung (TW);
Jui-Fu Hsueh, Tainan (TW);
Kuan-Chu Chen, Tainan (TW)

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,736,425 A * 5/1973 Chernow *H01J 37/3171*
250/491.1
5,215,639 A 6/1993 Boys
6,027,631 A * 2/2000 Broadbent 205/137
6,045,671 A * 4/2000 Wu et al. 506/40
2005/0034979 A1* 2/2005 Druz et al. 204/298.02

* cited by examiner

(73) Assignee: **Taiwan Semiconductor Manufacturing Co., Ltd.**, Hsin-Chu (TW)

Primary Examiner — Jason M Berman

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 570 days.

(74) *Attorney, Agent, or Firm* — Duane Morris LLP; Steven E. Koffis

(21) Appl. No.: **13/689,172**

(22) Filed: **Nov. 29, 2012**

(65) **Prior Publication Data**

US 2014/0144769 A1 May 29, 2014

(57) **ABSTRACT**

A sputtering apparatus comprises a chamber configured to contain at least one sputter target and at least one substrate to be coated. The chamber has at least one adjustable shielding member defining an adjustable aperture. The member is positioned between the at least one sputter target and the at least one substrate. The aperture is adjustable in at least one of the group consisting of area and shape.

(51) **Int. Cl.**

C23C 14/34 (2006.01)
C23C 14/08 (2006.01)
H01J 37/32 (2006.01)
C23C 14/56 (2006.01)

(52) **U.S. Cl.**

CPC *C23C 14/086* (2013.01); *C23C 14/3407*

20 Claims, 7 Drawing Sheets

