(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
10 October 2002 (10.10.2002)

PCT

(10) International Publication Number
WO 02/079760 A3

(51) International Patent Classification[7]: G01N 21/21, 21/47, 21/956, 21/25, H01L 21/66

(21) International Application Number: PCT/US02/09938

(22) International Filing Date: 29 March 2002 (29.03.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/280,714 30 March 2001 (30.03.2001) US

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(81) Designated State *(national)*: JP.

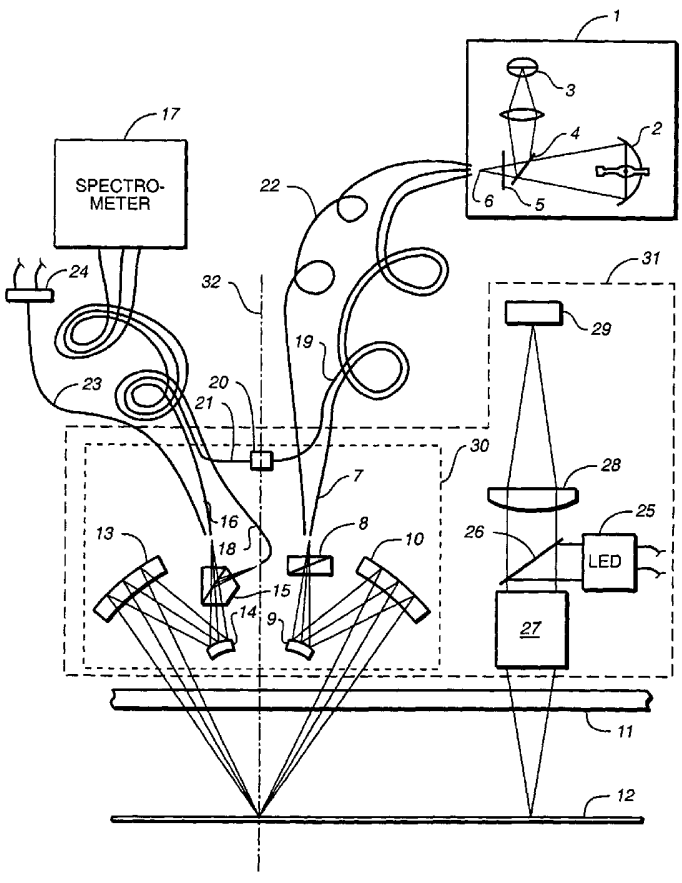
(84) Designated States *(regional)*: European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR).

Published:
— *with international search report*
— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

(88) Date of publication of the international search report:
20 March 2003

[Continued on next page]

(54) Title: POLARIMETRIC SCATTEROMETER FOR CRITICAL DIMENSION MEASUREMENTS OF PERIODIC STRUCTURES



(57) Abstract: An optical measurement system for evaluating a sample has an azimuthally rotatable measurement head. A motor-driven rotating mechanism is coupled to the measurement head to allow the optics to rotate with respect to the sample. In particular, a preferred embodiment is a polarimetric scatterometer (Fig. 1) for measuring optical properties of a periodic structure on a wafer sample (12). This scatterometer has optics (30) directing a polarized illumination beam at non-normal incidence onto the periodic structure. In addition to a polarizer (8), the illumination path can also be provided with an E-O modulator for modulating the polarization. The measurement head optics also collect light reflected from the periodic structure and feed that light to a spectrometer (17) for measurement. A polarization beamsplitter (18) is provided in the collection path so that both S and P polarization from the sample can be separately measured. The entire measurement head can be mounted for rotation of the plane of incidence to different azimuthal directions relative to the periodic structures on the wafer. The instrument can be integrated within a wafer process tool in which wafers may be provided at arbitrary orientation.

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 02/09938

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G01N21/21 G01N21/47 G01N21/956 G01N21/25 H01L21/66

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G01N H01L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
COMPENDEX, EPO-Internal, INSPEC, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 816 926 A (CANON KK) 7 January 1998 (1998-01-07)	6-12,17, 24,25, 27,39, 41, 45-49, 53, 59-64, 67,68
Y	page 3, line 29 - line 34	1-5, 28-30, 32, 34-38, 54,55, 57,65
	page 6, line 52 -page 7, line 42 page 8, line 47 - line 49 figure 2	

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
27 December 2002	08/01/2003

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Verdoodt, E

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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