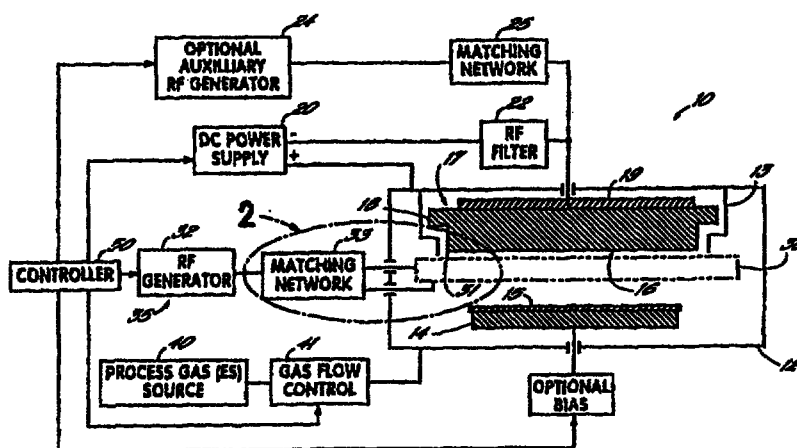


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International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : C23C 14/24, H01L 21/306	A1	(11) International Publication Number: ✓ WO 98/53116 (43) International Publication Date: 26 November 1998 (26.11.98)
(21) International Application Number: ✓ PCT/US98/10417 (22) International Filing Date: ✓ 21 May 1998 (21.05.98) (30) Priority Data: ✓ 08/861,958 ✓ 22 May 1997 (22.05.97) ✓ US See Oct 15/306 (71) Applicant: TOKYO ELECTRON ARIZONA, INC. [US/US]; 2120 W. Guadalupe Road, Gilbert, AZ 85233-8205 (US). (72) Inventor: LANTSMAN, Alexander, D.; ✓ 4 Kennedy Terrace, Middletown, NY 10940 (US). (74) Agents: JORDAN, Joseph, R. et al.; Wood, Herron & Evans, L.L.P., 2700 Carew Tower, Cincinnati, OH 45202 (US).		(81) Designated States: CN, JP, KR, SG European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> 9905150-0 1P053 copy

(54) Title: METHOD AND APPARATUS FOR LOW PRESSURE SPUTTERING ✓



(57) Abstract

Sputtering processes are carried out at low pressure (61b), of less than one milli-Torr, particularly in the range of 0.05 to 0.5 mTorr, to reduce scattering of the sputtered particles due to collisions with atoms of the process gas, particularly for coating contacts at the bottoms of sub-micron sized holes of high aspect ratios. The sputtering is made possible by provision for a supplemental RF plasma generating source (35) by which RF energy is reactively coupled into the gas within the chamber (12) in close proximity to the surface of a sputtering target (16), preferably adjacent the periphery thereof. The pressure (61) in the chamber as well as the power to an RF electrode (30) by which the supplemental plasma is energized and the DC power (63) by which the main target (16) is energized are dynamically controlled so that the plasma is sustained at low pressure (61b). First, the pressure in the chamber is raised to above 1 mTorr while the RF power (62) on the supplemental electrode (30) is applied to ignite the plasma, then this RF power is reduced and DC power (63) on the target is increased to an operating level (63a), whereupon the pressure in the chamber is reduced to below 1 mTorr for the low pressure sputtering of the wafer.