TABLE 1-continued

Dose to Size for Various Assist Layer Formulations

Formulation	30-nm Dose to size mJ/cm^2	30-nm % Reduction in dose	26-nm Dose to size mJ/cm^2	26-nm % Reduction in dose
1C	9.4	19		
2	8.4	28	9.5	21
3	6.8	42	7.6	37
4	7.3	37	8.0	34
E^{2}Stack ® AL412	11.7	N/A	12.1	N/A

Example 8

Lithography Results

A spin on carbon hardmask, Opti Stack® SOC110D-310 (Brewer Science, Inc.) was coated onto a silicon wafer at 1,500 rpm for 60 seconds, followed by baking at 205° C. for 60 seconds to form a film having a thickness of 100 nm. Various dilutions of Formulation 6 were then coated onto wafers at ~1,500 rpm for 60 seconds, followed by baking at 205° C. for 60 seconds to form films of various thicknesses. An ArF resist was applied to the film followed by a 105° C. bake for 60 seconds, then an exposure at a wavelength of 193 nm and developing with 0.26N TMAH for 30 seconds.

Three successive etches were performed. The first etch was used to open the assist layer, and used CF_4 gas at 35 sccm flow, 50 mTorr pressure, 100 W power, and 357 V DC bias. The second etch was used to open the SOC, and used Ar:CO_2 at 25 sccm flow for both gases, 20 mTorr pressure, 300 W power, and 736 V DC bias. Finally, the third etch was also for the SOC, and used O_2:N_2 at 20 sccm flow for both gases, 20 mTorr pressure, 300 W power, and 705 V DC bias. Pattern transfer was successful, but some CD edge trimming was observed. FIGS. **14-17** show these results.

Example 9

Lithography Results

Formulation 6 was used in a multilayer stack that included an underlayer, the assist layer, and an EUV resist. Without the use of Formulation 6, the Dose to Size was measured to be 9.4 ml/cm^2. Use of Formulation 6 as an assist layer reduced the Dose to Size to 7.8 mJ/cm^2 and allowed patterning of 28 nm lines and spaces, shown in FIG. **18**.

We claim:

1. A method of forming a structure, said method comprising:

providing a substrate, said substrate optionally including one or more intermediate layers thereon;

spin coating a composition to form an assist layer on said substrate, or on said one or more intermediate layers, if present, said assist layer being a cured film comprising at least about 0.01% by weight metal, based upon the total weight of the cured film taken as 100% by weight;

forming a photoresist layer on said assist layer; and

subjecting at least a portion of said photoresist layer to EUV radiation.

2. The method of claim **1**, said metal being selected from the group consisting of Al, Mg, Na, Zn, Co, Cu, Ga, Ge, Hf, Ti, Zr, Se, Ni, V, Ar, Sc, and Si.

3. The method of claim **1**, said assist layer being formed from a composition comprising a metal or metal derivative selected from the group consisting of metal halides, metal carbides, metal sulfides, metal nitrides, metal oxides, and mixtures thereof.

4. The method of claim **3**, wherein said metal or metal derivative is selected from the group consisting of Si, SiO_2, Si_3N_4, AlN, Al_2O_3, ZrC, ZrO_2, Hf, HfO_2, TiN, TiO, TiO_2, Ti_2O_3, Mg_3N_2, MgO, W, WO, WO_2, and WO_3.

5. The method of claim **1**, wherein said substrate is selected from the group consisting of silicon, SiGe, SiO_2, Si_3N_4, aluminum, Al_2O_3, hafnium, zirconium, titanium, magnesium, tungsten, tungsten silicide, gallium arsenide, germanium, tantalum, tantalum nitride, indium, and indium phosphide.

6. The method of claim **1**, wherein said assist layer is formed from a composition comprising a crosslinking agent.

7. The method of claim **1**, wherein said subjecting said photoresist layer to EUV radiation is carried out with a dose of from about 5 mJ/cm^2 to about 100 mJ/cm^2.

8. The method of claim **1**, further comprising forming a pattern in said photoresist layer after said subjecting of said photoresist layer to EUV radiation.

9. The method of claim **8**, further comprising transferring said pattern to said assist layer; to said intermediate layers, if present; and to said substrate.

10. The method of claim **9**, wherein said transferring said pattern comprises etching said assist layer; intermediate layers, if present; and said substrate.

11. The method of claim **9**, wherein said pattern has a resolution of less than about 32 nm.

12. The method of claim **8**, wherein said forming a pattern in said photoresist layer comprises contacting said photoresist layer with a developer so as to remove some of said photoresist layer.

13. The method of claim **1**, wherein said assist layer is formed from a composition that is substantially free of photoacid generators.

14. The method of claim **1**, said substrate including one or more intermediate layers, one of said intermediate layers being the uppermost intermediate layer, and said uppermost intermediate layer being a carbon layer.

15. A method of forming a structure, said method comprising:

providing a substrate, said substrate optionally including one or more intermediate layers thereon;

forming an assist layer on said substrate, or on said one or more intermediate layers, if present, said assist layer formed from a composition comprising a crosslinking agent and being a cured film comprising at least about 0.01% by weight metal, based upon the total weight of the cured film taken as 100% by weight;

forming a photoresist layer on said assist layer; and

subjecting at least a portion of said photoresist layer to EUV radiation.

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