

# United States Patent [19]

Wang et al.

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5,219,485

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[54] MATERIALS AND METHODS FOR ETCHING SILICIDES, POLYCRYSTALLINE SILICON AND POLYCIDES

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[73] Assignee:

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Calif.

[21] Appl. No.: 778,326

[22] Filed:

Oct. 17, 1991

## Related U.S. Application Data

[60] Division of Ser. No. 443,811, Nov. 29, 1989, Pat. No. 5,112,435, which is a continuation of Ser. No. 185,256, Apr. 19, 1988, abandoned, which is a continuation of Ser. No. 786,783, Oct. 11, 1985, abandoned.

[51]	Int. Cl. <sup>5</sup>	H01L 21/302
[52]	U.S. Cl	
	156/64	C. 156 /656. 156 /657. 156 /669

[58] Field of Search ...... 156/643, 646, 656, 657, 156/662; 252/79.3

### [56] References Cited U.S. PATENT DOCUMENTS

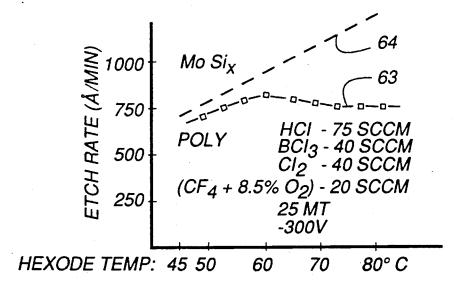
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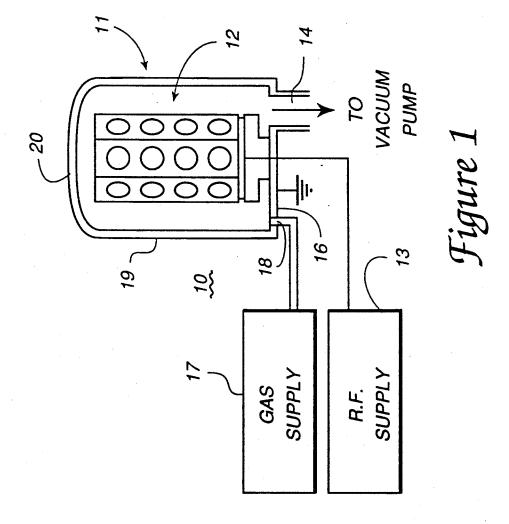
Primary Examiner-Thi Dang Attorney, Agent, or Firm-Philip A. Dalton

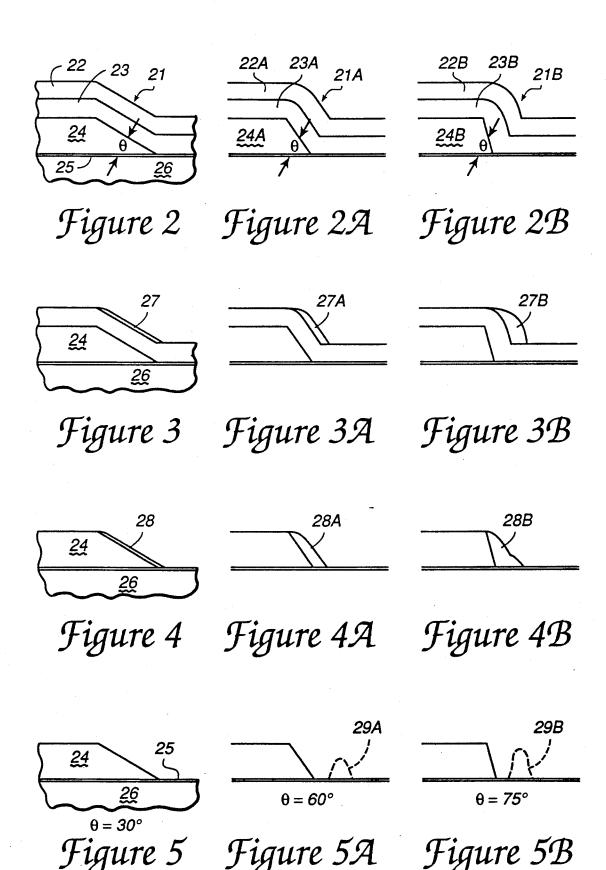
#### **ABSTRACT** [57]

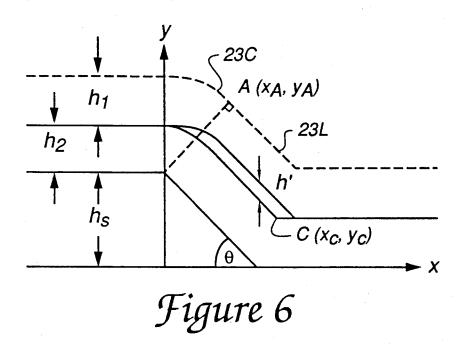
Gas chemistry and a related RIE mode process is described for etching silicides of the refractory metals titanium, tantalum, tungsten and aluminum and for etching composites of these silicides on polycrystalline silicon layers. BCl3 is added to the HCl/Cl2 gas chemistry used for the polysilicon etch along with additives selected from fluorinated gases and oxygen to satisfy the multiple requirement of the two-step silicide-polysilicon etch process, including the silicide-to-polysilicon etch ratio requirement.

### 9 Claims, 11 Drawing Sheets









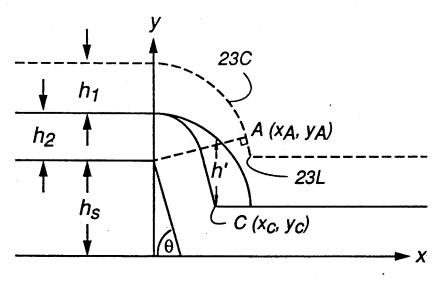
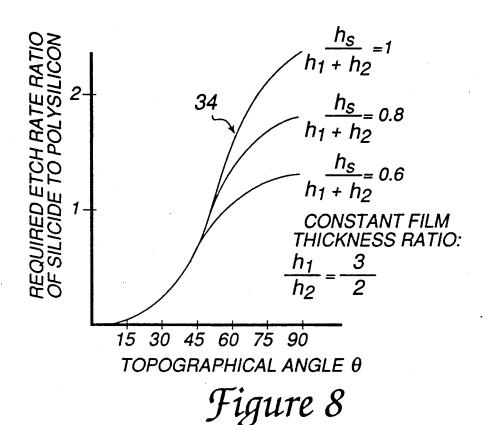
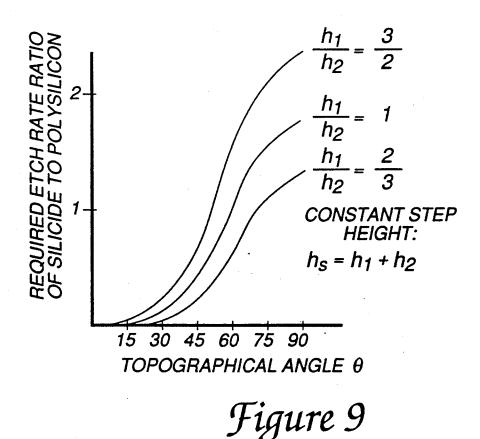


Figure 7







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