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United States Patent [19]
Pavate et al.

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[45] Date of Patent: Dec. 14, 1999

- [54] TARGET FOR USE IN MAGNETRON SPUTTERING OF ALUMINUM FOR FORMING METALLIZATION FILMS HAVING LOW DEFECT DENSITIES AND METHODS FOR MANUFACTURING AND USING SUCH TARGET
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[73] Assignee: Applied Materials, Inc., Santa Clara, Calif.
[21] Appl. No.: 08/979,192
[22] Filed: Nov. 26, 1997
[51] Int. Cl. C23C 14/34
[52] U.S. Cl. 204/298.12; 204/298.13; 204/298.16; 204/298.21; 148/237; 420/528
[58] Field of Search 204/298.12, 298.13, 204/298.16, 298.19, 298.21; 148/237; 420/528

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Primary Examiner—Alan Diamond
Attorney, Agent, or Firm—Fliesler, Dubb, Meyer & Lovejoy

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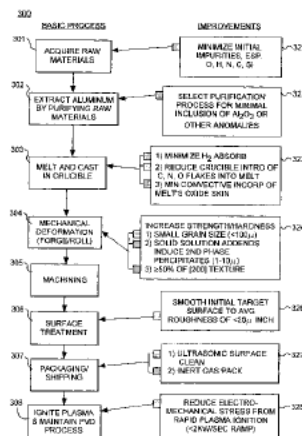
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[57] ABSTRACT

Improved targets for use in DC magnetron sputtering of aluminum or like metals are disclosed for forming metallization films having low defect densities. Methods for manufacturing and using such targets are also disclosed. Conductivity anomalies such as those composed of metal oxide inclusions can induce arcing between the target surface and the plasma. The arcing can lead to production of excessive deposition material in the form of splats or blobs. Reducing the content of conductivity anomalies and strengthening the to-be-deposited material is seen to reduce production of such splats or blobs. Other splat limiting steps include smooth finishing of the target surface and low-stress ramp up of the plasma.

30 Claims, 5 Drawing Sheets



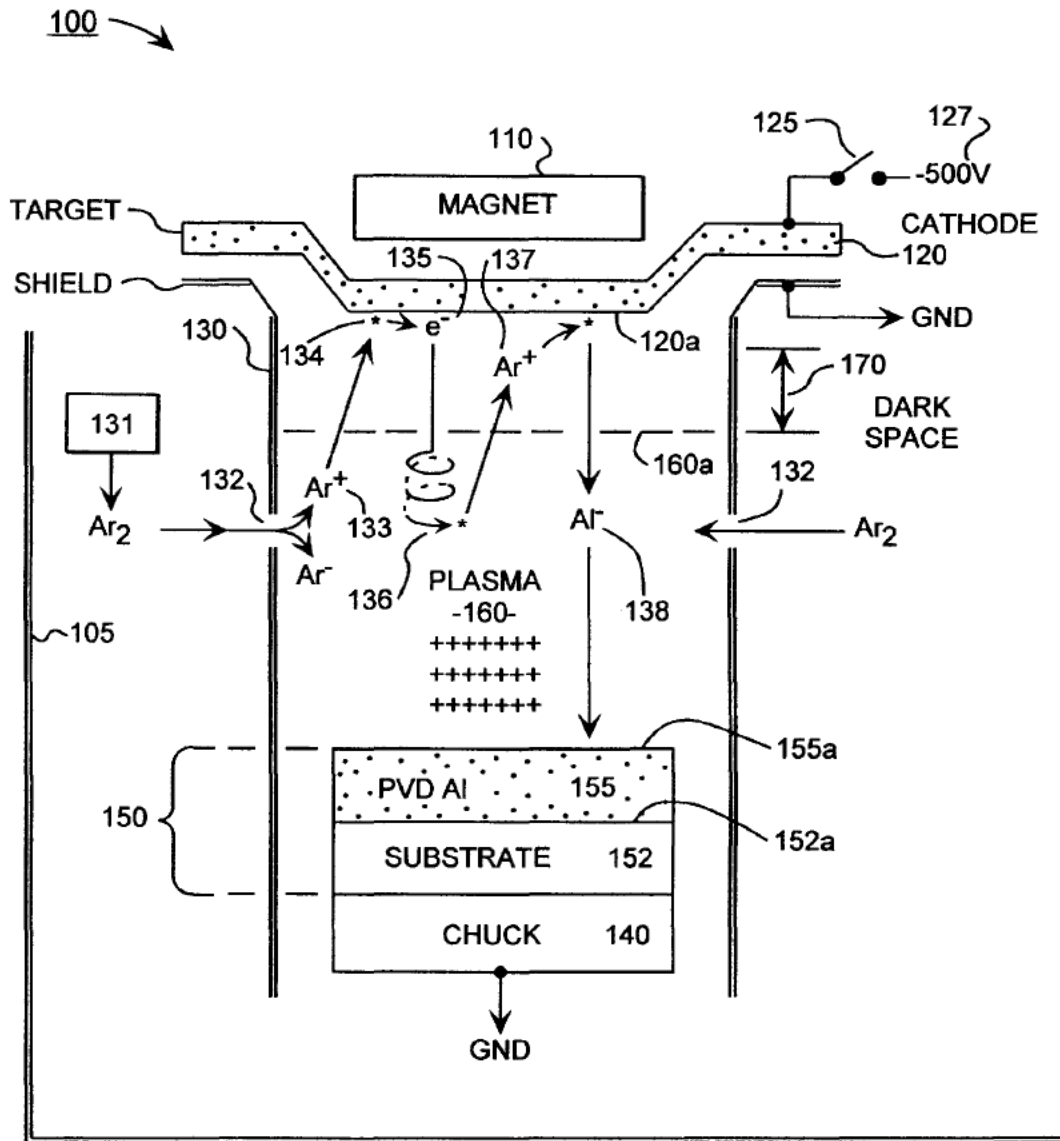


FIG. 1

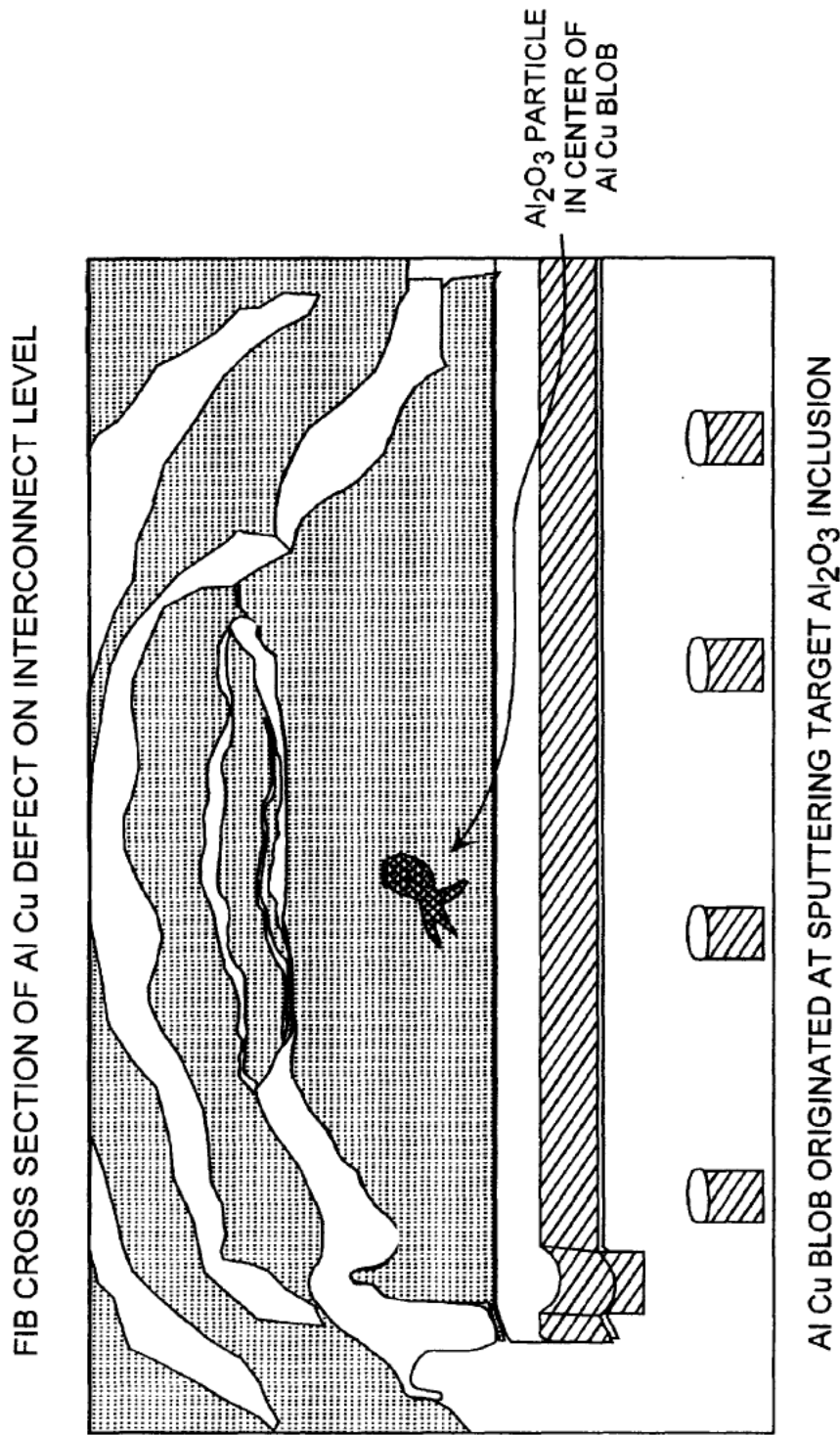


FIG. 2

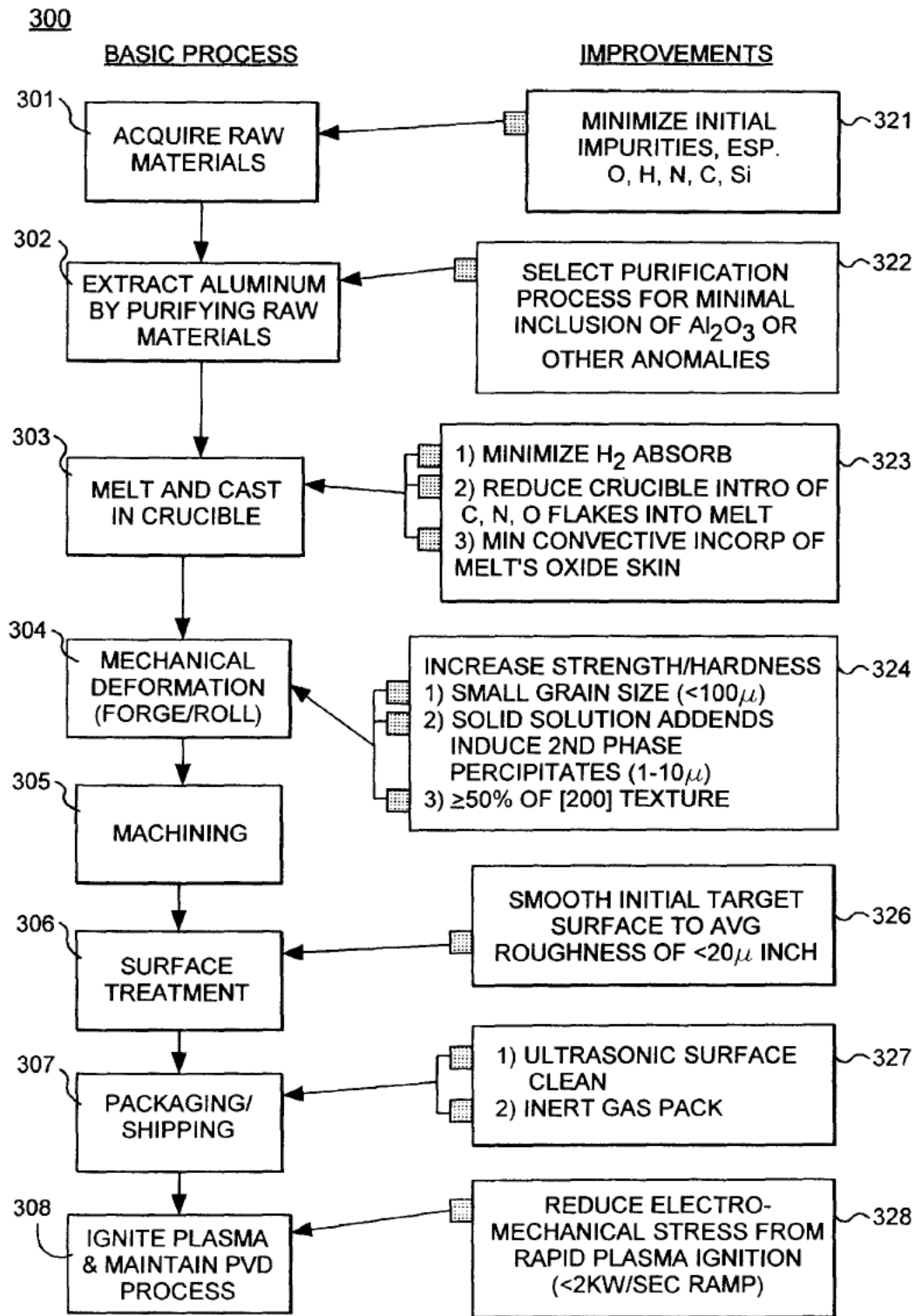


FIG. 3

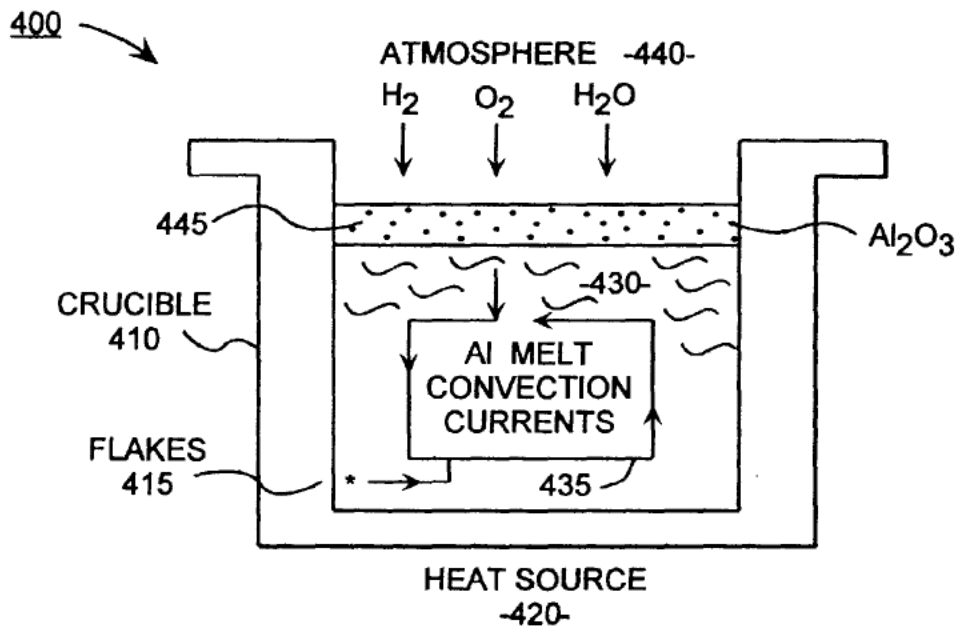


FIG. 4A

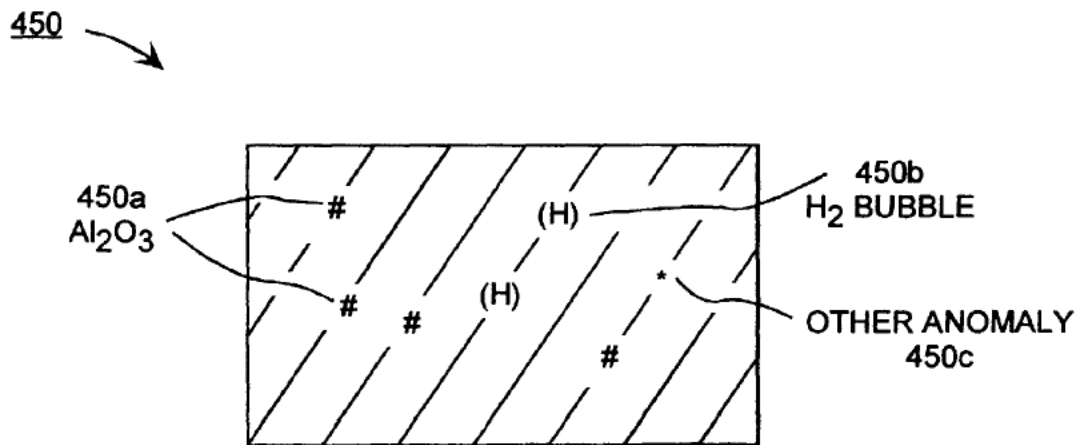


FIG. 4B

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