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ABSTRACT

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Cathodic Arc Plasma Deposition of Niobium Nitride Films

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Two methods of cathodic arc plasma deposition are used to deposit niobium nitride films in a nitrogen ambient: (a) cathodic arc deposition without energetic ion bombardment, and (b) metal plasma immersion dynamic mixing deposition. Smooth and complete niobium nitride film can be fabricated using process (a) at room temperature but not by process (b) unless the temperature is raised to 500Å°C. The influences of substrate temperature on the film composition, grain size, and selected orientation are studied for the films deposited using process (b). The films have a selected orientation of (220) at a deposition at 300 Å°C and a selected orientation of (200) at 500Å°C. The grain size in the films increases as the substrate temperature is increased. The N content in the films initially increases and then decreases as the substrate temperature goes up.