Title	**CoaTiN®** Titanium Nitride Thin Film Formation on Metal Substrate by Chemical Vapor Deposition in a Magnetized Sheet Plasma Source
Overview	CoaTiN® relates to titanium nitride (TiN) thin film formation on metal substrate by chemical vapor deposition in a magnetized sheet plasma source. CoaTiN® surmounts the limitations of existing coating techniques through the new process where no heating mechanism is introduced. The film synthesis is relatively short and can be done over a wide substrate surface without sacrificing the film quality. Although the invention demonstrates the capacity of synthesizing TiN for small-sized samples, the wide area plasma could very well serve the coating of larger samples. The short duration of coating the TiN film on metal substrate without the use of heating mechanisms makes this invention very promising for nitriding of metals.
Key Features	The plasma source is composed of five main parts namely: a production chamber, two plasma limiters, a main discharge vacuum chamber, and an anode. This innovative process overcomes limitations in previous coating technologies without sacrificing the quality of the end-product. No heating mechanism is introduced, the film synthesis is relatively short and can be done over a wide substrate surface.
Applications	Semiconductor industry, metal coating industry, and molding industry. Coating can be applied to tools used in various industries such as medicine, engineering, and manufacturing, among others.
User/Customer Edge	TiN coating has many desirable characteristics, giving it an edge over other coating technology. TiN increases the surface hardness of tools, providing protection against abrasion and the damaging effects of friction during industrial processes. Its non-stick property and ability to maintain tool sharpness provide increased durability and resistance to wear and corrosion. It also prolongs the tools' lifetime while creating better finishes.
Market Opportunities	A TiN film is a remarkably hard and wear-resistant coating on tools. Due to its chemical inertness, it decreases the rate of abrasive wear during the cutting process and the chemical interaction between the tool and the work piece. Techniques such as chemical vapor deposition, physical vapor deposition, ion plating, ion beam-assisted deposition, sputtering, and hybrid processes have been used to prepare TiN films. The film produced by these techniques, however, often exhibits poor adhesion to the substrate. It also requires a high deposition temperature and lengthy thin film formation but covers a limited substrate surface.
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