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Turning HIPIMS/HPPMS into a Product

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It is just a little more than 10 years ago that the basic principle of HPPMS/HIPIMS has been presented. Intensive research by a number of groups from the coating community revealed huge benefits as higher ionisation level, denser films with enhanced morphology, more uniform coating of 3D objects and better film adhesion.
The suppliers of industrial job coating as well as the end users became aware of this new technology and the first applications have come to the market in 2009. This presentation will outline the industrial HPPMS/HIPIMS application history so far.
At first the focus was set to migrating and integrating HPPMS/HIPIMS sources into industrial coating equipment. Moreover the need for supplying large area cathodes, process stability including arc management is a must for commercial applications. Features as the door assembly of the pulse generators to avoid long power leads, pulse synchronisation for a multi-cathode system and a dedicated table supply are crucial for successful scaling up.
Exciting process development activities have started based on the hardware platforms that are available now. Examples will illustrate the first successful HPPMS/HIPIMS applications. Cutting tool people focus on the well balanced hardness/toughness ratio offered by HPPMS/HIPIMS films that is rather beneficial for interrupted cutting. The outstanding oxidation resistance of the films pushes ahead today's cutting speed limits. DLC type coatings are common for applications targeting the tribological properties of components. The high power pulse technology is a step forward in designing the interface between the substrate and the carbon top layer. The hardness of the top layer increases in HPPMS/HIPIMS regime.
The search for new solutions to cope with the CO_2 issue increases the demand for batteries, fuel cells and membrane technology. Common to these areas is the need for dense films on rather temperature sensitive materials as polymers. First results indicate that depositing oxides with HPPMS/HIPIMS is an option to explore future coating markets.

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