New concept of HIPIMS biasing - power supply and process parameters selection

Pawel Ozimek, Andrzej Klimczak, Piotr Różański, Mariusz Cichowlas

Huettinger Electronic Sp. z.o.o., Zielonka, Poland.

High **I**mpulse **P**ower **M**agnetron **S**puttering (**HIPIMS**) is going to be more and more interesting for commercial, industrial applications. It gives highly ionized sputter flux with several important benefits. The high interest in areas of hard & decorative coating as well as in semiconductor applications is observed. Number of those applications requires a biasing voltage and for some of them, biasing voltage is really crucial.

Implementation of the bias power supply into HIPIMS process, gives several important benefits. Bias voltage accelerates ions arriving at the substrate and as a result adhesion improvement is visible. Additionally, increased mobility of depositing species and high density of coating microstructure is achievable.

HIPIMS applications give to the bias power supply three main requirements:

- ➔ stable voltage during HIPIMS pulses (low impedance voltage source),
- ➔ arc management fast enough to switch off rapidly rising bias current,
- ➔ clear distinction of substrate arc and the regular substrate peak current,

which are in opposition and cannot be achieved by using power supplies currently available on the market.

These requirements were on focus of HUETTINGER Electronic development. As a result a new bias power supply for HIPIMS applications was introduced to the market. The core of the ARC management is a current limiting device (solution patented by HUETTINGER).
Additionally, Bias power supply maintains a perfectly stable output voltage (in both LV and HV operation modes) during dynamic changes of the load, which may take place during pulses generated by the HIMIPS power supply.

The solution assures very effective arc management during the operation with very high bias current (up to 300A) and stable voltage within the pulses as well as between them will be presented.