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How to transfer HIPIMS processes using different cathodes and machines

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HIPIMS processes have reached industrial level and there is a number of commercial HIPIMS solutions on the market. Nevertheless, the most efforts in development are still made using lab scale systems and cathodes. Exploiting these results and successfully transferring them to larger scale quite often presents a major challenge. In many cases the current, or better the peak current (peak current density) attached to the cathode is referred as the main parameter for scaling.
Transferring processes between different cathodes and therefore different magnetic configuration will influence the electrical parameters applied to the cathode. Even more critical is shifting the coating system. This paper addresses issues concerning the transfer between different cathodes and coating systems. Instead of focusing on the electrical parameters applied at the cathode the situation at the substrate position is observed. Plasma properties like electron and ion density or electron temperature, as well as the ion to neutral ratio of the film forming species are used to characterize the process conditions for the film formation. Tailoring the input parameters at the cathode to reach comparable situation at the substrate is discussed. Finally, results of film growth and morphology are shown as first indication of proper choice for a successful approach for process scaling and transfer.

Keywords
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