

# The high power impulse magnetron sputtering discharge (HIPIMS)

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## Abstract

High power impulse magnetron sputtering (HIPIMS) is a sputtering technique that utilizes ionized physical vapor deposition (IPVD). High density plasma is created by applying a high power pulse to a planar magnetron discharge. Measurements of the temporal and spatial behavior of the plasma parameters indicate peak electron density of the order of  $10^{19} \text{ m}^{-3}$ . The electron density peak expands from the target with a fixed velocity that depends on the gas pressure. The high electron density results in a high degree of ionization of the deposition material. Reported values of the fractional ionization are in the range 4.5 % up to more than 90 % depending on the sputtered species. This is important since ions are controllable with respect to energy and direction as they arrive to the growth surface. The plasma physics of the HIPIMS will be discussed as well as some of applications of the HIPIMS technique.