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Laser Assisted Plasma Coatings at Atmospheric Pressure (LAPCAP) ZIHAO OUYANG, VIJAY SURLA, KYONGNAM KIM, MARTIN NEUMANN, DAVID RUZIC, University of Illinois at Urbana-Champaign — The Center for Plasma-Material Interactions (CPMI) has developed a new Laser Assisted Plasma Coatings at Atmospheric Pressure (LAPCAP) system that will allow high quality, non-porous and uniform coatings on variety of substrates. The basic principle of LAPCAP is to utilize a pulsed Nd:YAG laser (5-10 ns) with an intensity in the range of 10^{10} – 10^{11} W/cm² to ablate target particles and feed them into the plasma torch for deposition. A large range of materials such as metals and ceramics can be ablated using the laser. A new atmospheric pressure plasma torch based on microwave frequency (2.45 GHz) is developed for this purpose, which is characterized using optical emission spectroscopy (OES). The velocity of the plasma jet is measured using a Pitot tube. In addition, the laser ablation of Yttria-stabilized zirconia (YSZ) target material is currently being investigated for different laser operating parameters to optimize the particle flux and distribution as suitable for the coating requirements.

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