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A New Design and Model for Plasma Spraying with an Inductively Coupled RF Plasma Torch EDDIE HOLIK III, PETER MCINTYRE, AKHDIYOR SATTAROV, Texas A&M University — Plasma torches are commonly used to coat metal substrates with a refractory outer cap material. This is accomplished by introducing the coating as a powder into the plasma plume as it exits the torch or on the central axis with a carrier gas. These locations are effective at heating the powder but offer little control over powder temperature. This work proposes to take advantage of some of the properties of an inductively coupled RF plasma torch (ICPT) to introduce the powder spray as an aerosol dispersion in an inert carrier gas directly into certain flow streamlines as they enter the plasma torch. Moreover, multiple powders may be introduced onto different streamlines, which are then heated to different temperatures in the torch, to provide control of non-equilibrium-phase reactions. Modeling the fluid dynamics and temperature distribution is critical in designing such a plasma torch. Computer simulation of current and potential ICPT designs and some prospective uses will be presented.

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