Abstract of the Disclosure

System and Method for Utilization of Shrouded Plasma Spray or Shrouded Liquid Suspension Injection in Suspension Plasma Spray Processes

A system and method for producing thermal spray coatings on a substrate from a liquid suspension is disclosed. The disclosed system and method include a thermal spray torch for generating a plasma and a liquid suspension delivery subsystem for delivering a flow of liquid suspension with sub-micron particles to the plasma to produce a plasma effluent. The liquid suspension delivery subsystem comprises an injector or nozzle which can produce an inert or reactive gas sheath partially or fully surrounding the plasma effluent. A sheath can also be used to isolate injection of the liquid suspension. A gas assist stream can also be employed at or near the suspension injection point. The shroud, sheath or gas assist technique can retain the sub-micron particles entrained within the plasma effluent and substantially prevent entrainment of ambient gases into the plasma effluent. The liquid suspension delivery subsystem can be arranged as an axial injection system, a radial internal injection system or an external radial injection system.

Fig. 4