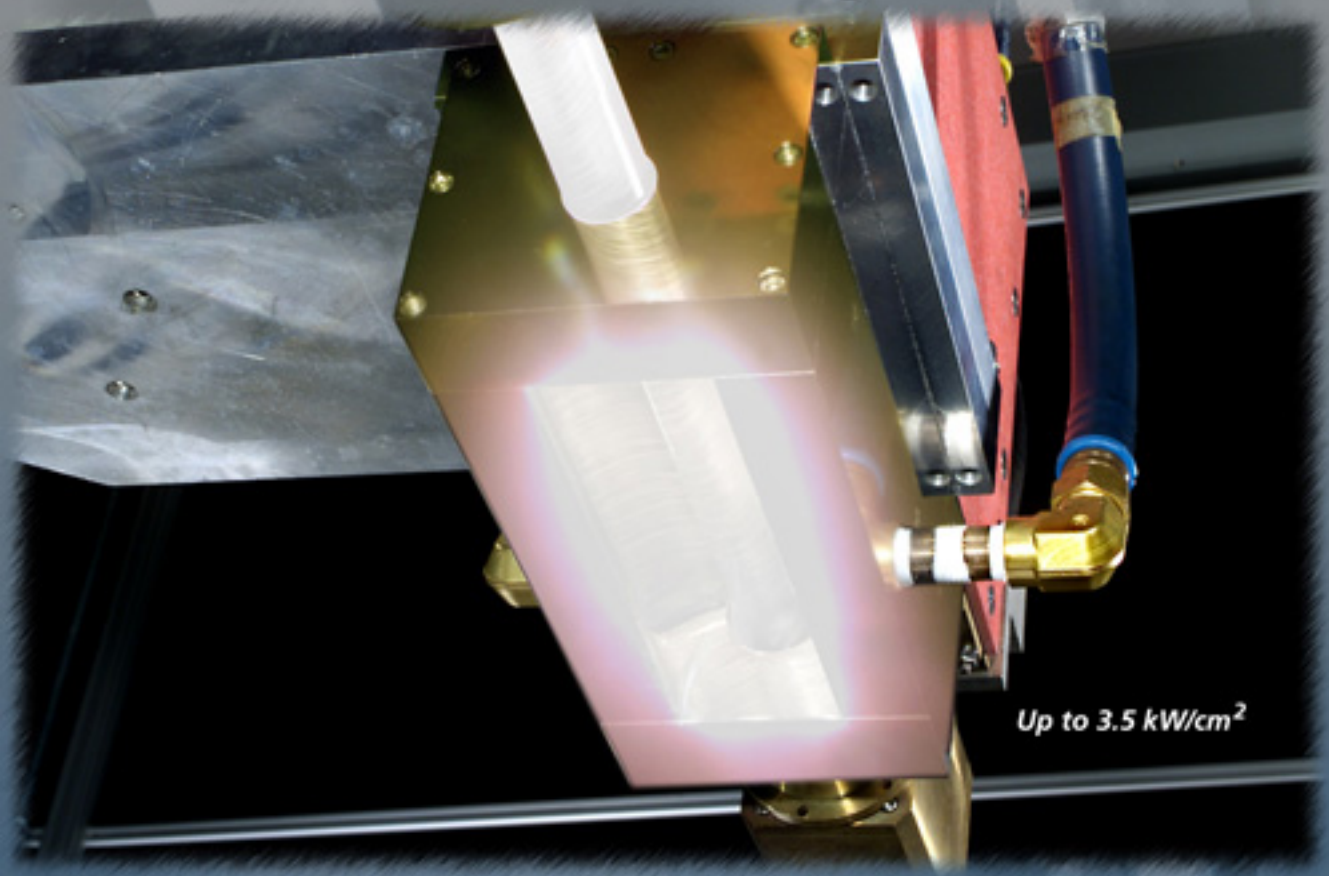
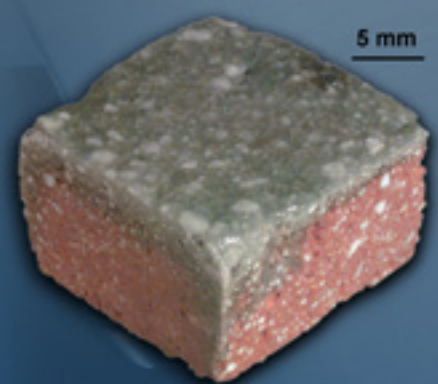
Plasma Infrared Processing of Materials

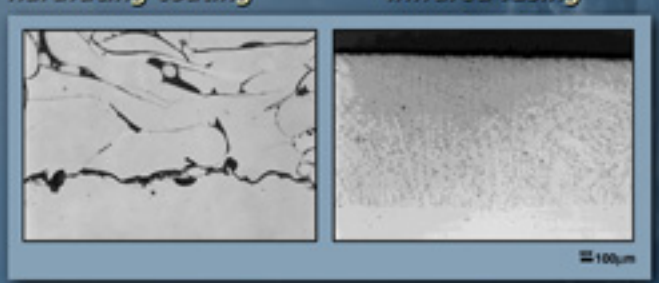


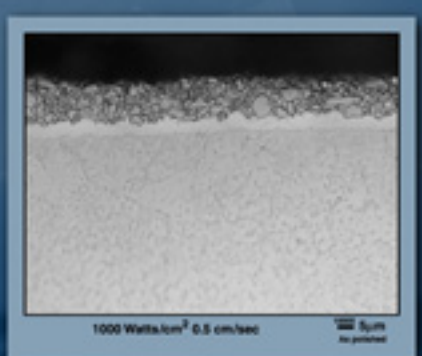


Fused surface on mullite refractories

Flame sprayed Ni-20Cr hardfacing coating

After plasma infrared fusing





Fused WC/Ni coating on 4340 steel

Research performed at

ornl

Oak Ridge National Laboratory

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Plasma Infrared Processing of Materials

A high-density-infrared, transient-liquid coating process has been developed to produce wear- and corrosion-resistant coatings on a variety of surfaces that are of commercial interest. The process combines plasma infrared heating with power densities up to 3.5 kW/cm^2 with a room-temperature spray process to quickly form wear- and/or corrosion-resistant coatings in seconds. This process has been demonstrated using Cr_2C_3 and WC-reinforced coatings with nickel-based binders. Coating densities as high as 98–100 percent of theoretical density have been achieved with coating thickness of 10 μm to 2 mm. The same processing techniques have also been shown to be capable of performing localized and selective heat treatment of surfaces.

For additional information, please contact:

Craig Blue
Oak Ridge National Laboratory
1 Bethel Valley Rd.
Oak Ridge, TN 37831-6083
Telephone: (865) 574-4351
E-mail: blueca@ornl.gov

and

Peter Angelini
Oak Ridge National Laboratory
1 Bethel Valley Rd.
Oak Ridge, TN 37831-6065
Telephone: (865) 574-4565
E-mail: angelinip@ornl.gov