

Fabrication of Titanium Diboride-Based High Emissive Paint Coating Using Economical Dip Coating Method for High Temperature Applications

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Abstract : A cost-effective titanium diboride (TiB₂) paint coating has been developed on stainless steel substrate using commercially available polyvinylpyrrolidone as a binder by convenient dip-coating technique. The emittance of the coating has been explored by tailoring various process parameters to obtain highest thermal radiation. The optimized coating has achieved a high thermal emittance of 0.85. In addition, the coating exhibited an excellent thermal stability while heat-treated at 500 °C in air. Along with the emittance, the structural and physical properties of the As-deposited and heat-treated coatings have been investigated systematically. The high temperature annealing has not affected the emittance, chemical composition and morphology of the coating significantly. Hence, the fabricated paint coating is expected to open up new possibilities for using it as a low-cost, thermally stable emitter in high temperature applications.

Keywords : titanium diboride, emittance, paint coating, thermal stability

Conference Title : ICMSE 2017 : International Conference on Materials Science and Engineering

Conference Location : Amsterdam, Netherlands

Conference Dates : May 14-15, 2017