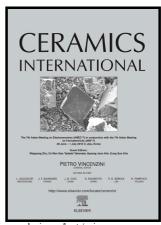
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DIRECTIONALLY SOLIDIFIED Al 2O3-ME₃Al₅O₁₂ (ME: Y, Er and Yb) EUTECTIC COATINGS FOR THERMOPHOTOVOLTAIC **SYSTEMS**

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ACCEPTED MANUSCRIPT

DIRECTIONALLY SOLIDIFIED Al₂O₃-ME₃Al₅O₁₂ (ME: Y, Er and Yb)

EUTECTIC COATINGS FOR THERMOPHOTOVOLTAIC SYSTEMS

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ABSTRACT

Selective emitters for thermophotovoltaic systems consisting of directionally solidified Al₂O₃-ME₃Al₅O₁₂ (ME: Y, Er and Yb) eutectic coatings on Al₂O₃ substrates were produced and characterizated. Coatings were deposited by dip-coating on cylindrical substrates. After sintering, a continuous-wave CO₂ laser was used to produce the surface resolidification. The optimization of the processing parameters yielded dense eutectic coatings with good adhesion to the substrate and with 90-200 µm in thickness. All coatings were free of voids and showed a eutectic microstructure consisting of a three dimensional interpenetrated network of Al₂O₃ and ME₃Al₅O₁₂. The mechanical properties of the coatings (hardness and fracture toughness) were evaluated by indentation techniques. Thermal emission was studied by heating the rods with a CO₂ laser at temperatures between 1000 and 1400 °C. Selective emission was observed in

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