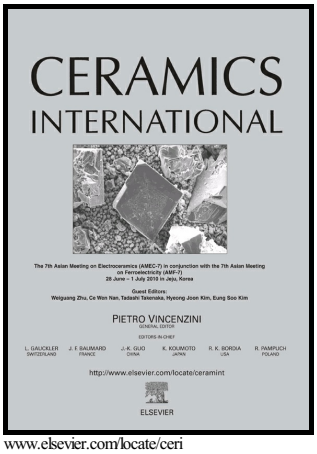

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ABSTRACT

Selective emitters for thermophotovoltaic systems consisting of directionally solidified Al_2O_3-$ME_3Al_5O_{12}$ (ME: Y, Er and Yb) eutectic coatings on Al_2O_3 substrates were produced and characterizated. Coatings were deposited by dip-coating on cylindrical substrates. After sintering, a continuous-wave CO_2 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 Al_2O_3 and $ME_3Al_5O_{12}$. 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 CO_2 laser at temperatures between 1000 and 1400 ºC. Selective emission was observed in