

Effect of alumina addition on the microstructure of the plasma sprayed yttria stabilized zirconia

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Abstract

MICROSTRUCTURAL CHARACTERISTICS OF PLASMA SPRAYED ALUMINA - DOPED ZIRCONIA

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Solid oxide fuel cells (SOFCs) are one of the most important applications of electroceramics. Plasma spraying is a quick and inexpensive method for fabrication of ceramics films. In this paper, a method for preparation of yttria stabilized zirconia (YSZ) films by atmospheric plasma spraying with regard to SOFC applications is presented. Yttria stabilized zirconia with different amount of Y₂O₃ from 8 to 15 mol% have been used to prepare plasma sprayed YSZ films. A small amount of alumina to stabilize zirconia reportedly increases grain-boundary conductivity. The influence of the addition of alumina varying from 0 to 5 mol% on the microstructural characteristics of plasma sprayed zirconia is discussed in this work. The effect of dopant has been studied by scanning electron microscopy (SEM) and X-ray diffractometry analysis (XRD). A relationship between the microstructural characteristics of plasma sprayed YSZ as well as dopant content was used to describe the influence of the additive on the sintering behaviour of plasma sprayed zirconia.