

FABRICATION OF POROUS Sb-DOPED BARIUM TITANATE CERAMICS USING SELF-ADHESIVE CARBON GRAINS FROM OIL PALM EMPTY FRUIT BUNCHES AS PORE-FORMING AGENT

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ABSTRACT

Self-adhesive carbon grains (SACG) from oil palm empty fruit bunches were used as pore-forming agent (PFA) in the fabrication of porous Sb-doped barium titanate (BaTiO_3) ceramics. Porous Sb-doped BaTiO_3 ceramics containing SACG were prepared by sintering mixtures of metal oxides at 1350°C for 2 hours in air. The effect of SACG addition on density, structure, microstructure, porosity and electrical resistivity of the porous ceramics produced was investigated. All the sintered ceramics showed a tetragonal structure, irrespective of the amount of SACG added. The porosity of the ceramics increased and the grain size decreased with increasing SACG contents. The prepared porous ceramics exhibit PTCR behavior in which the PTCR jump of the ceramics with SACG was about 10^4 which is higher than that of the ceramics without SACG. The increasing in the PTCR jump with increasing SACG content was attributed mainly to the increase in the electrical barrier height of grain boundaries and the porosity. It was found that the SACG is an effective PFA for fabricating porous BaTiO_3 -based ceramics.

Keywords: Self-adhesive carbon grains; Pore-forming agent; Sb-doped barium titanate;

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