

ZrO₂-SnO₂ porous ceramic for soil moisture sensor application

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The current market requirements for the automation and control of processes in the monitoring of environmental parameters have motivated the characterization and the development of sensors and sensor systems for soil moisture. Despite the existence of many sensors available in Brazil, mostly imported, they do not meet satisfactorily the specific needs of the country, since they are designed for different environmental conditions. For this, ceramic materials have unique chemical and physical properties, which combined with their absorption capacity / surface adsorption of water molecules makes them excellent candidates for application as sensing elements for moisture, in different climatic conditions [1, 2]. This work is part of Environmental Technologies Research Line (TECAMB/LAS/INPE) for the development and improvement of instrumentation applied to the environment, more precisely sensing elements of soil water content and air humidity. Thus, in this work, ZrO₂-SnO₂ ceramic sensing elements were confectioned from the adequate choice of commercial powders, which were mixed mechanically, compacted uniaxially and sinterized at different temperatures. The characterization of the sintered ceramics were carried out through scanning electron microscopy (SEM) and X-ray diffraction. The density was determined by Archimedes method. Electrical measurements of capacitance, as function of pre-established moisture values, were performed in sintered ceramics specimens prepared as capacitor, in a climatic chamber, by using a RLC bridge.

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References

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