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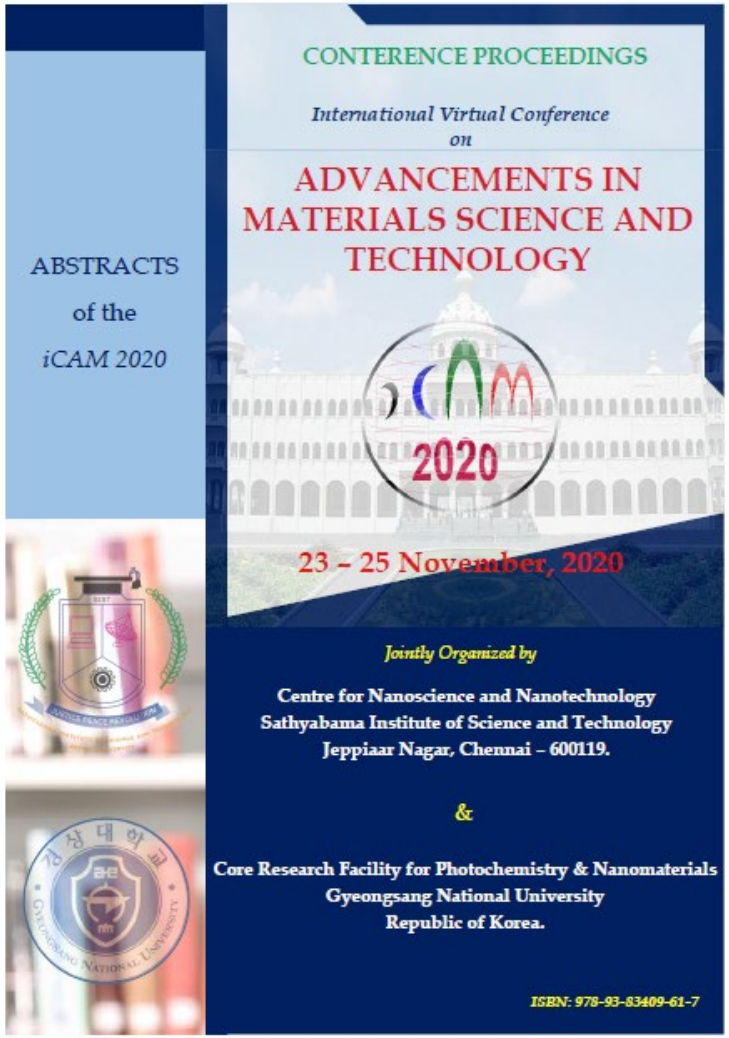
ABSTRACTS
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Keywords: *Iron Vanadate; Nanolayers; Pseudocapacitor; Electrochemical Studies; Cyclic Stability.*

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Ceria-Based Composite Materials for Low Temperature Solid Oxide Fuel Cells

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ABSTRACT

The solid oxide fuel cell (SOFC) is a potential high-efficiency electrochemical device for vehicles, auxiliary power units and large-scale stationary heat and power plants. The main challenges of this technology for market acceptance are associated with cost and lifetime due to the high temperature operation (700-1000°C) and complex cell structure. Therefore, it has become a top R&D goal to develop SOFCs for lower temperatures. To address these problems, two kinds of innovative approaches are adopted within the framework. One is developing functional composite materials with desirable electrical properties at reduced temperatures, which results in the research on the ceria-based composite based low temperature ceramic fuel cell. The other one is discovering novel energy conversion technology - Single-component/ electrolyte-free fuel cell (EFFC). The electrolysis study has been carried out on ceria carbonate composite based LTCFC with inexpensive Ni-based electrodes. Both oxygen ion and proton conductance in electrolysis mode are observed. High current outputs have been achieved at the given electrolysis voltage below 600°C.The major scientific content and contribution to these challenging fields are divided into three aspects: Continuous development and optimization of advanced electrolyte materials, ceria carbonate composite for LTCFC.

Keywords: *Solid Oxide Fuel; Cell; Ceria-Based Composite; Perovskites; Ceria Based Low Temperature Ceramic Fuel Cell.*