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### Synthesis and electrochemical investigation of cubic structured Fe-doped-SrCoO<sub>3</sub> nanocomposite cathode for LT-SOFC

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Low-temperature solid oxide fuel cell (LT-SOFC) is one of the most favorable energy conversion systems that are need of hour. The advancement in field of LT-SOFC requires a highly efficient, oxygen permeable, good electro-chemical cathode. The SCF (Sr<sub>0.3</sub>Co<sub>0.6</sub>Fe<sub>0.1</sub>) oxide composite cathode was prepared by environmental friendly sol-gel method. The crystal structure of prepared materials was analyzed by x-ray diffractometry, while structural characteristic were studied by Fourier transform infra-red spectroscopy (FTIR). The particle size was calculated by Scherer's formula and found to be 36 nm. The results were also confirmed by SEM images. The prepared material showed porous coral reef like surface morphology in recorded scanning electron micrograph. The activation energy was calculated by Arrhenius curve that is  $3.0 \times 10^{-2}$  eV and highest electronic conductivity measured and calculated was 24.01 S/cm. SCF oxide cathode was tested for potential LT-SOFC between the range of 450°C-650°C temperature. The maximum current density and power density obtained at 650°C was 887 mAcm<sup>-2</sup> and 110 mWcm<sup>-2</sup> respectively.

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