National Institute of Technology Rourkela

Defence Seminar

Seminar Title	: Studies on the Electrocatalytic Activity, Electrical Conductivity, and Oxygen Transport Properties of La0.5Sr0.5Co0.8Fe0.2-xMxO3-□ [M = Cu, Al, & Ni x = 0 – 0.2] Perovskite Oxides
Speaker	: Rupesh Mandal (Rollno : 516cr6007)
Supervisor	: Prof. Swadesh Kumar Pratihar
Venue	: Seminar hall of CR in hybrid mode (https://meet.google.com/tuv-knic-upf)
Date and Time	: 08 Apr 2024 (11:00 AM)
Abstract	: A parametric evaluation on a series of Co-rich $La_{0.5}Sr_{0.5}Co_{0.8}Fe_{0.2-x}M_xO_{3-\&delta}$ (M = Cu, Al, & Ni: x = 0 - 0.20)perovskite oxides were fabricated and systematically characterized. These oxides have a cubic structure with a space group of Pm3m. The $LSCN_{0.2}$ oxide showed the highest degree of oxygen non-stoichiometry. The oxygen evolution reaction (OER) behaviour study indicated that Al dopant improves the overall performance of the perovskite materials. This enhancement is attributed to increased oxygen vacancy concentration and surface area. The stability behavior of the perovskites series was assessed. The $LSCFA_{0.1}$ oxide required a lower potential of &sim1.66 V vs. RHE to achieve 10 mA cm^{-2} current density. Remarkably, $LSCFA_{0.1}$ oxides required less potential to reach 10 mA cm^{-2} among studied oxides. The $LSCN_{0.2}$ oxide exhibited the highest conductivity, LSCFA0.1 showed the lowest, and the LSCC0.2 sample exhibited the intermediate. Sample $LSCN_{0.2}$ exhibited the highest K_{chem} and Dchem values measured at 650 oC, compared to other series of compositions, and has the potential as a membrane material for oxygen gas separation application.