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Characterization of Strontium-doped Lanthanum Manganite Solid Oxide Fuel Cell Cathodes

Lanthanum strontium manganite (LSM) is a perovskite ceramic used as a cathode material in fuel cells. Here at Montana State University, recent attempts to utilize it in fuel cells have been inexplicably failing. In my project, I am sintering LSM pellets at various temperatures (100^{o} C intervals from 1000^{o} C to 1500^{o} C) and performing both x-ray diffraction and electrochemical impedance spectroscopy on the sintered pellets in order to determine what synthesis parameters optimize their performance. The data obtained will be used as a reference for future work in the laboratory on LSM, since our results will likely differ from those seen in scientific literature due to the nuances of different laboratory equipment and methodologies. Our pellets are pressed at 250MPa. Silver paste and silver wire are used to connect the pellet and EIS apparatus. Data is collected at 50^{o} C intervals from around 300^{o} C to 900^{o} C at frequencies ranging from 1Hz to 10MHz. X-ray diffraction data is also obtained and used in the identification of different phases.