Author Guidelines

The Basics

1. **Margins:** Set up your paper (click on File then Page Set Up in MS Word) using 8 ½ x 11 inch Letter paper size and set for **0.75 inch** margins on the top and bottom and **1 inch** margins on the left and right sides.
2. **Page Limits:**
    a. INVITED Presentations: no more than 16 pages
    b. CONTRIBUTED and POSTER Presentations: no more than 12 pages
3. **Font:** All text should be 12 point (pt) Times or Times New Roman font.
4. **Spacing and blank lines:** All text must be single-spaced. Insert a blank line (single space) before all headings and subheadings, but not between paragraphs within each section.
5. **Indenting:** Indent each paragraph by one tab and choose justified paragraph alignment for the body of the paper under each heading or sub-heading.

Parts of the paper

1. **Title:** The title should be flush left. Letters should all be uppercase except for compounds and chemical formulas (e.g., Al_2O_3 not AL2O3).
2. **Author info:** Flush left, upper and lower case.
3. **Abstract:** The Abstract should not exceed 250 words.
4. **Body text:** Regular text, 12 pt. font, justified type. The first line of text should be indented one tab and should appear directly below the heading (no blank line). Do not use bold, underline, or italics in the text.
5. **Headings and subheadings**
    - Headings: Flush left, 12 pt. font, all uppercase letters (no bold or italics)
    - Subheadings: Flush left, 12 pt. font, upper and lower case (no bold or ital.)

Artwork (Images, tables, graphs)

1. There are two types of figures you may work with in your paper: “line-art” (spot graphs, bar graphs, etc.) and “photo-images” (micrographs, photos, etc.). You will need to supply figures that will look good in a professional publication – that means including each type of figure at specific resolutions or “dots-per-inch” (dpi).
2. Make sure to embed your micrographs, photos and other images (see below for details)
3. You MUST include photo-images at 300 dpi (minimum); failure to do so will result in washed-out and/or blurred images when printed; even if photo-images are not scanned (i.e. the image is already in electronic format), they still must be set to at least 300 dpi for good reproduction.
4. If any line-art must be scanned, it MUST be scanned at 600 dpi (minimum); failure to do so will result in jagged lines when printed. Crop and place images in your electronic document where you want it to appear in the paper.
    - Note: images prepared for the web are set at 72 dpi and make for a very poor product; avoid using images pulled from web-based material.

5. The preferred file formats for any graphics are either EPS for TIFF; using other formats, such as JPG or GIF will decrease the value to some extent.
6. Make sure all type in graphs and figures is large enough to read and understand.
7. Keep all text and artwork within the template margins.
8. COLOR IS ACCEPTABLE, BUT THE PUBLICATION WILL BE PRINTED IN BLACK AND WHITE, SO...Avoid light colors such as yellow, light blue, light green and pink. Delineation between plots in a graph should be indicated by type of symbol and/or line pattern; avoid color graphs where delineation between plots is indicated by color alone.
9. Type the caption under each figure. Number tables with Roman numerals followed by the table title and place above the table.

Extras

1. **Equations:** Equations should be centered and separated from the text by one blank line above and below. Number equations consecutively in parentheses at the right-hand margin, in line with the last line of the equation.
2. **Footnotes:** Identify footnotes with an asterisk (*) and type them at the end of the paper. If more than one footnote appears, identify them with multiple asterisks.
3. **References:** Number references consecutively in the text with superscript numbers, and list corresponding references at the end of the paper.

Embedding images into a Word document

- To insert an image/figure into a Word document, you simply put the cursor where you want the picture to go, click on "insert," then "picture," then "from file." There is no other way to do it.
- It is important to realize that when a figure has type in it, that type will carry all the way over to press. So it is important that the fonts are included at every stage, i.e., they must be embedded in the PDF (see below).
- If a figure is scanned, there are no fonts, just pixels, so fonts are not a problem, but scanned figures must be at high resolution to reproduce well in print.

Embedding fonts in PDFs

This is the procedure for making PDFs with fonts embedded:

1) When “printing*” the Word document to a PDF, click on "Properties" in the print dialogue box.
2) Next click on "Adobe PDF Settings."
3) Then open "Standard."
4) You will then see a tab for "Fonts" to the right. Click on that.
5) Make sure there is a check mark in the "Embed all fonts" box at the top.
6) Make sure there is a check mark in the "Subset and embed . . ." box.
7) The percentage in the window should be "100%."
8) The "When embedding fails" box should say "Cancel job". (This makes it impossible to produce a PDF with missing fonts.)
9) The "Font source" window lists all of the fonts on your system. Highlight all of the fonts on the left, click on the "Add" in the middle, and the fonts will appear in the "Always embed" box on the right. There should be nothing in the "Never embed" window.

Once you make these changes, they should apply to all future PDFs.

*** "Printing" to PDF is actually saving a document as a file; the word "printing" is deceiving in this case.**

EFFECT OF CHROMIUM DOPING ON THE CRYSTAL STRUCTURE, ELECTRICAL CONDUCTIVITY AND THERMAL EXPANSION OF MANGANESE COBALT SPINEL OXIDES

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ABSTRACT

Metallic interconnects have reduced the cost of solid oxide fuel cells, however their oxidation during operation and chromium volatilization can cause serious problems, such as chromium poisoning and cell degradation, so ceramic coatings have been developed as barriers to chromium and oxygen diffusion. Among them, $Mn_{1.5}Co_{1.5}O_4$ spinel has shown promising performance. To evaluate the long-term stability of the coating the properties of the reaction layer formed between the spinel coating and the Cr_2O_3 scale on the alloy surface need to be characterized. In this work, the crystal structure, electrical conductivity and thermal expansion of several manganese cobalt spinel samples, $(Mn,Co)_{3-x}Cr_xO_4$ ($0 \leq x \leq 2$) were determined. The crystal structure was determined using x-ray diffraction, electrical conductivity was measured by the 4-probe DC method and thermal expansion was tested from room temperature to 1000 ^oC. With increasing Cr content the cubic crystal structure was stabilized, the electrical conductivity decreased and thermal expansion coefficient decreased. The decrease in electrical conductivity indicates that formation of the reaction layer, $(Mn,Co)_{3-x}Cr_xO_4$, may lead to an increase in electrical resistance of the spinel coating, which will increase the overall cell resistance.

INTRODUCTION

Solid oxide fuel cells (SOFCs) are highly efficient and environmentally friendly power devices. The interconnect is a critical part in SOFCs because it not only connects the individual cells electrically, but also separates the air and fuel atmospheres of different cells.[1] The current research focuses on lowering the operating temperature within 600 to 800^oC without compromising the materials performance. For the interconnect, metallic alloys seem to be a good choice due to their easy fabrication and low cost compared with their ceramic counterparts. ..……

EXPERIMENTAL

$(Mn,Co)_{3-x}Cr_xO_4$ (x=0, 0.5, 1, 1.5 and 2) spinel oxides were synthesized by solid state reaction. The mixtures of MnO (99%, Alfa Aesar), Co_3O_4 (99.83%, Fisher) and Cr_2O_3 (99%, Acros) were ball-milled for 48hr with de-ionized water, and dried overnight. The pre-mixed powders were pressed into pellets and bars, and then sintered in air at 1200^oC for 24hr……

RESULTS AND DISCUSSION

XRD Phase Analysis

Figure 1 shows the XRD patterns of $(Mn,Co)_{3-x}Cr_xO_4$ (x=0, 0.5, 1, 1.5 and 2) spinel oxides at room temperature. $Mn_{1.5}Co_{1.5}O_4$ shows a mixture of cubic and tetragonal phases, which correspond to JCPDS No. 23-1237 and 18-0408. This result is consistent with ……..

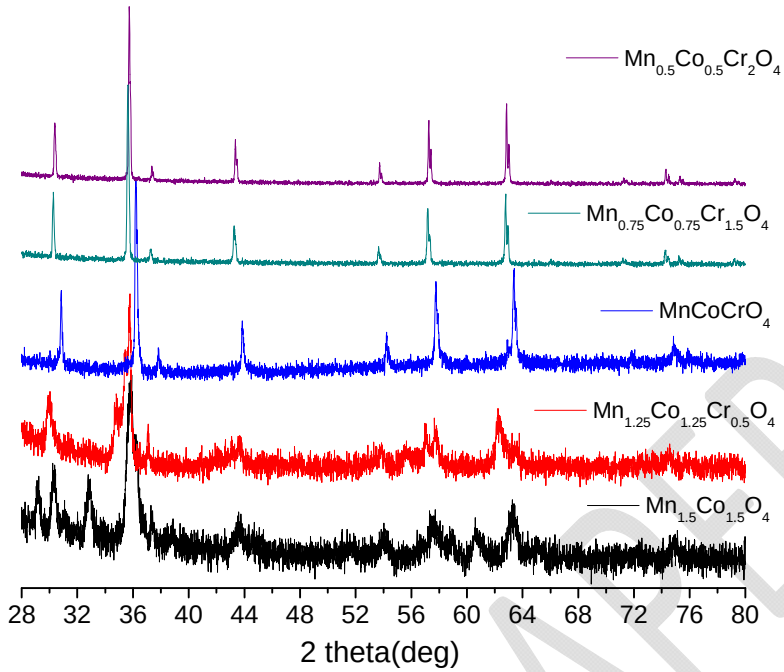

Figure 1. XRD patterns of $(Mn,Co)_{3-x}Cr_xO_4$ (x=0, 0.5, 1, 1.5 and 2) spinel oxides.

The small polaron hopping mechanism can be expressed as

$$\sigma = \frac{A}{T}\exp(-\frac{E_a}{k_b T}) \tag{1}$$

Thermal Expansion Test

Table 1 lists the TEC of $(Mn,Co)_{3-x}Cr_xO_4$ (x=0, 0.5, 1, 1.5 and 2) spinel oxides in air and shows that Cr doping decreases the TEC of Mn-Co-O spinel oxide. For comparison, the TEC……..

Table I. TEC of $(Mn,Co)_{3-x}Cr_xO_4$ (x=0, 0.5, 1, 1.5 and 2) spinel oxides.

	TEC (20-1000°C, x10^{-6}/ ^{o}C) in air
$Mn_{1.5}Co_{1.5}O_4$	10.8
$Mn_{1.25}Co_{1.25}Cr_{0.5}O_4$	9.94
$MnCoCrO_4$	8.80
$Mn_{0.75}Co_{0.75}Cr_{1.5}O_4$	7.51
$Mn_{0.4}Co_{0.6}Cr_2O_4$	6.76

CONCLUSION

$(Mn,Co)_{3-x}Cr_xO_4$ ($0 \le x \le 2$) spinel oxides were synthesized by solid state reaction. The effects of Cr doping on the crystal structure, electrical conductivity and thermal expansion were investigated. When Cr increased, the structure at room temperature ……

ACKNOWLEDGEMENT

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REFERENCES

[1]S. C. Singhal, K. Kendall, High-temperature Solid Oxide Fuel Cells: Fundamentals, Design and Applications, *Elsevier Advanced Technology*, Oxford, 2003.

[2]N. Shaigan, W. Qu, D. G. Ivey, and W. Chen, A Review of Recent Progress in Coatings, Surface Modifications and Alloy Developments for Solid Oxide Fuel Cell Ferritic Stainless Steel Interconnects, *J. Power Sources*, **195**, 1529-42 (2010)……..