AN EFFECTIVE ABSTRACT FOR *ScienceMONTGOMERY*

Purpose of the Abstract

Structure of the Abstract

Guidelines

Examples

Purpose of Abstract

VERY brief summary of your work:

- Present the background of research in your area (from bibliography)
- Lay out the question you expected to answer
- Describe what you did
- Present your results and their relevance to your research question and area.

STRUCTURE OF THE ABSTRACT

Four general sections

1. Background of science and/or importance of research topic (very brief!)
2. Purpose/Hypothesis (thesis or statement of problem)
3. Procedures/Data/Observations
4. Conclusions/Applications

STEPS TO CREATING AN EFFECTIVE ABSTRACT

- Start early with a Research Project Idea
  - Use the "Structure of the Abstract" to plan out the Project Idea
  - Describe what you expect to happen doing the Project

GUIDELINES: Techniques for a more effective Abstract

- One paragraph to one page long.
  - Black print on white paper
- Large legible font
  - Times New Roman or Verdana--12 or 14 font size
  - Space-and-a-half works well
- Short sentences, correct tense, active voice, varied structure
- Be consistent with Display—Same title (exactly), same key words, same results

GUIDELINES: Techniques for a more effective Abstract

- Edit carefully—get someone else to read it.
  - Use correct scientific terms, correct abbreviations, correct units
  - Spell check, grammar check, punctuation check
- Mount on your display and leave 12-15 copies on table
  - Category Judges all day
  - Community Awards judging in the afternoon
- Abstract is submitted to ScienceMONTGOMERY with other forms

GUIDELINES: Techniques for a more effective Abstract

- Use only Student First Name and Project Title on Final Abstract
  - No school affiliation
  - No mention of laboratory or sponsor
  - No Teacher name
- No graphs or photos in the Abstract

GUIDELINES: Techniques for a more effective Abstract

- Make it about YOUR work for THIS YEAR's Project
  - Not your parents help and support
  - Not your supervisor's lab research
  - Not Einstein's equations
  - Not last year's work

Additional PURPOSES OF THE ABSTRACT

1. Guide the Student's speech to all Judges

2. Provide Community Awards Judges with Highlights of their Topic

- Review 2008 Community Awards winners for potential targets

  prize criteria, and winning project titles

  at www.sciencemontgomery.org/About us/Past winners

- Use "buzz words" from Community Awards criteria when appropriate

  Sample:

  International Society for Optical Engineering-SPIE:

  For outstanding Optics or Photonics Related Technology

  --Certificate and $200

Abstracts from the $50,000 winners at the 2008 Intel International Science and Engineering Fair

- EFFICIENT HYDROGEN PRODUCTION USING CU-ZN-AL CATALYSTS PREPARED BY HOMOGENEOUS PRECIPITATION METHOD
  Yi-Han Su, Taipei First Girls High School, Taipei, CHINESE TAIPEI

- DEVELOPMENT OF BIOSENSORS FOR DETECTING HAZARDOUS CHEMICALS
  Natalie Saranga Omattage
  The Mississippi School for Mathematics and Science, Columbus, MS

Omattage developed a more efficient and less expensive way to screen for food additive contaminants, including those responsible for the recent deaths of many pets. By developing biosensors based on quartz crystal microbalance (QCM), Omattage's research provides a new way for ports and warehouses to more thoroughly screen for food additives and other contaminants that could be found in food imported into the United States.

Su focused her efforts on identifying a high-activity catalyst that could improve methanol reforming reactions in order to generate hydrogen more efficiently. In doing so, Su has developed a method that can be used to improve the homogeneity of metal mixing and increase the surface area of catalysts which can also be used for the synthesis of other multi-composition materials with high homogeneity.

Sections of a great Abstract

1. Background of science and/or Importance of research topic (very brief!)
2. Purpose/Hypothesis (thesis or statement of problem)
3. Procedures/Data/Observations
4. Conclusions/Applications

EFFICIENT HYDROGEN PRODUCTION USING CU-ZN-AL CATALYSTS PREPARED BY HOMOGENEOUS PRECIPITATION METHOD

In industry, high-activity catalyst is desirable for methanol reforming reaction in order to generate hydrogen efficiently. In this project, multi-composition Cu-Zn-Al catalyst was synthesized by homogeneous precipitation (HP) method with urea treatment. In comparison with those obtained from conventional co-precipitation method, our technique offers an opportunity to improve the homogeneity of metal mixing and to increase the surface area of catalysts. By adjusting urea concentration, water amount, reaction temperature and time, various hydrotalcite-like compounds are obtained. The optimized catalysts having flower-like morphology, exhibited high surface area (78.5 m^2/g, as determined by Brunauer-Emmett-Teller method), and a lower reduction temperature. The HP-method derived Cu-Zn-Al catalyst exhibited higher methanol-conversion, hydrogen-production-rate and CO2-selectivity under methanol reforming reaction at 523K compared with those derived by co-precipitation method. To further improve the catalytic performance of the Cu-Zn-Al, Ce and Zr were employed to modify the support. The Ce/Zr-modified catalysts did show higher activity, as evidenced by a 20K lower reduction temperature and more than 85% of methanol conversion. Our method can be generalized for the synthesis of other multi-composition materials with high homogeneity.

EFFICIENT HYDROGEN PRODUCTION USING CU-ZN-AL CATALYSTS PREPARED BY HOMOGENEOUS PRECIPITATION METHOD, Y*i-Han Su*

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DEVELOPMENT OF BIOSENSORS FOR DETECTING HAZARDOUS CHEMICALS

Food additives contaminated with cyanuric acid and melamine were responsible for recent deaths of many pets. Food imports are currently being screened using chromatographic and mass spectrometric methods (e.g. HPLC & GC-MS/MS). Although these methods are very sensitive, the instruments as well as the reagents are expensive and require highly trained personnel to operate. A recombinant M13 bacteriophage library was screened to identify peptide sequences with high affinity to cyanuric acid and melamine. Amino acid sequences STNFFYQTFAFH and RNSNHTAYGEEP were identified as the consensus sequences specific to cyanuric acid and melamine, respectively. Quartz crystal microbalance (QCM) based biosensors were developed using these peptides. Although cyanuric acid binding peptide demonstrated better mass accumulation rates than the melamine binding peptide, both peptides were capable of detecting their respective ligands at concentrations as low as 1.25 parts per billion (ppb) during the first five minutes of the experiment. Cyanuric acid and Melamine binding peptides coupled to a gold binding peptide sequence are currently being developed to increase the peptide density and sensitivity of the assay. Biosensors with synthetic peptides could decrease the detection limit to picomolar concentrations of the ligands. QCM instruments are portable, cost much less than GC-MS setups, and do not require highly trained personnel to operate. Therefore, QCM based biosensors may be used at ports and warehouses to more thoroughly screen food additives imported into the United States. In addition to food contaminants, the QCM based biosensors may also be employed to detect other harmful chemicals.

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