

Writing Reports

Overview

- This presentation will cover:
 - Report format and organization
 - Visual design
 - Language
 - Source documentation

Report Format and Organization

- Report generally include these sections in this order:
 - Abstract
 - Introduction/Objective
 - Background
 - Methodology/Procedure
 - Results
 - Discussion
 - Conclusion
 - Recommendations

Report Format and Organization

- Abstract/Executive Summary
 - Always comes first
 - Is brief (one paragraph-one page)
 - Past tense
 - Content:
 - States research problem or main objective
 - Indicate the methodology used
 - Presents the main findings and conclusions

Report Format and Organization

- Abstract Example:

Surface modification of aluminum powders for the purpose of flow improvement was performed and several samples were prepared. Correlations between the flowability and reactivity for these powders as well as for the initial untreated aluminum powder were established. The powders were characterized using Scanning Electron Microscope (SEM), particle size distribution, angle of repose flowability test, Constant Volume Explosion (CVE) combustion test, and Thermo-Gravimetric Analysis (TGA). The surface modification of micron-sized aluminum powders was done by: (1) dry coating nano-particles of silica, titania and carbon black onto the surface of spherical aluminum powders and (2) chemically and physically altering the surface properties of the same powders with methyltrichlorosilane. All surface modifications improved flowability of the powders. CVE measurements indicate that powders with an improved flowability exhibit improved combustion characteristics if the powder treatment does not add an inert component to aluminum. The TGA results do not show significant differences in the reactivity of various powders. Based on combined flowability and CVE characteristics, the silane modified material gave the best results followed by the powders dry coated with carbon, titania and silica, respectively.

Source: "The Effects of Surface Modification of Aluminum Powder on its Flowability, Combustion, and Reactivity" Powder Technology

Report Format and Organization

- Introduction/Objective
 - Explains the research problem and its context
 - Explains importance of the problem (why does it matter?)
 - Applications of the experiment or theory
 - Explains reason and goals for study
 - Motivation

Report Format and Organization

- Background
 - Includes the theory for the experiments
 - Any equations required for the calculations
 - Each equation should be numbers
 - Included references

Report Format and Organization

- Methodology/Procedure
 - Is in past tense and passive voice (3rd person)
 - Do not use “We”, “I”, or “You”
 - Describes the experimental procedure and data collection
 - Included a schematic/diagram of the apparatus
 - Write in complete sentence
 - “The tank was filled with 5 L of water”
 - **NOT** “Fill tank with 5L of water”
- Incomplete sentence and present tense

Report Format and Organization

- Results
 - State the results in the text before presenting any graphs, figures or tables.
 - Text points out the most significant portions of research findings
 - Indicates key trends or relationships
 - Highlights expected and/or unexpected findings
 - Visual representation of results:
 - Graphs, tables or figures
 - Included error analysis
 - Past tense (these are results you measured, calculated or observed)

Report Format and Organization

- Discussion
 - Why did you observed what you observed?
 - Explanation for Results:
 - Comments on unexpected results, offering hypothesis for them
 - Comparison to literature
 - Does your research confirm previous studies? Deviate from them?

Report Format and Organization

- Conclusion
 - Discusses:
 - What was learned through research
 - Strengths and weakness of study
 - Possible applications of study (how it can be used)
 - Recommendations
- Recommendation
 - What would you do differently?
 - Any changes would you recommend for the experiment

Visual Design

- Graphics
 - Should be used to illustrate specific points
 - Should be incorporated in a way that is natural to report's content/context
 - Should be explained fully in text using references such as “Fig. 1 shows....”
 - Should be cited if taken from a source
 - Textual information should come before graphics

Visual Design

Table 1: Properties of the Raw Materials

Material		Density (g/ml)	Mean Particle Size	Function
Aluminum batch 1	H-5	2.70	9.44 μm	Host
Aluminum batch 2	H-5	2.70	9.09 μm	Host
Silica		2.65	20 nm	Guest
Carbon black		2.00	50 nm	Guest
Titania		4.23	21 nm	Guest

Visual Design

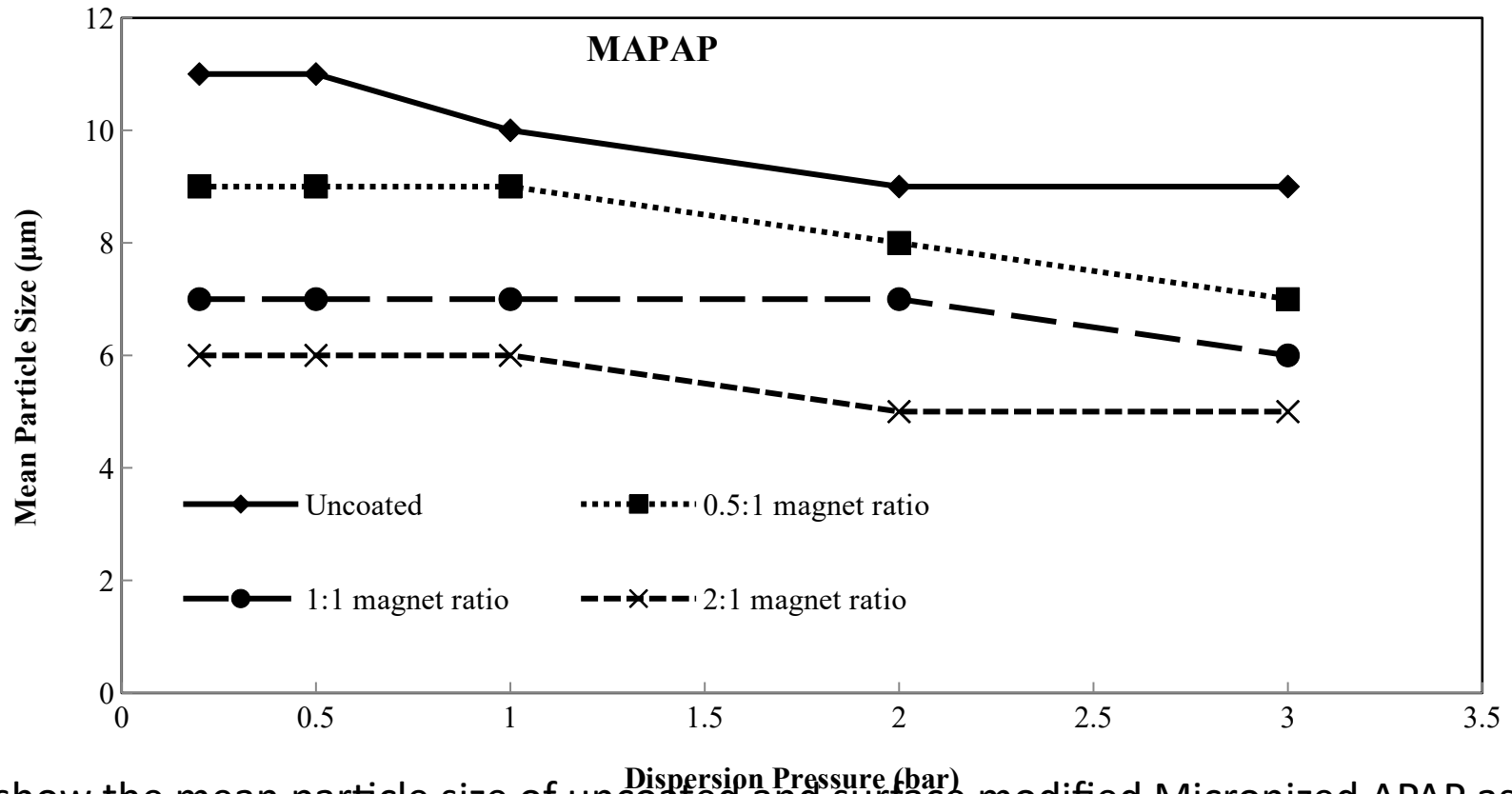


Figure 1: show the mean particle size of uncoated and surface modified Micronized APAP as a function of dispersion pressure. The plot shows the effects of magnet ratio on attrition.

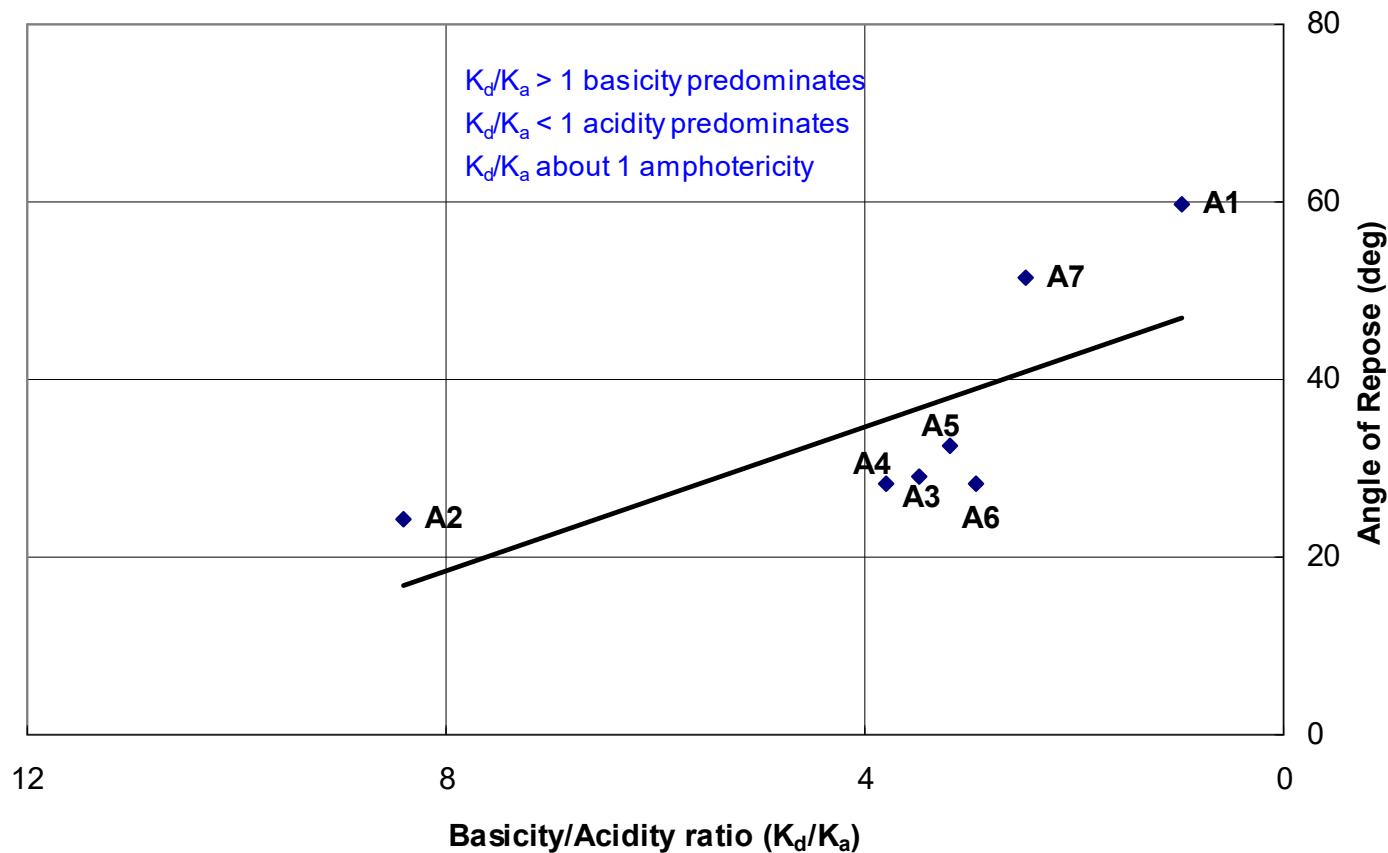


Figure 6.6: The relationship between the AOR and basicity/acidity ratio of the surface of the particles. The plot indicates that the more basic the surface of the aluminum powders, the lower the angle of repose which may correlate to better flowability. Note that the abscissa is plotted in a descending order so as to show the similarity with Figure 6.4.

Language and Vocabulary

- Reports should be easily accessible
 - Be straightforward and concise
 - Use simple terms, not jargon
 - Keep sentences short and simple (20 words max)
 - No common phases (be technical)
 - “in the ballpark”
 - Be specific and not general
 - Not “close” or “like” or “pretty” or “roughly”

Source Documentation

- Cite sources whenever you are quoting, paraphrasing, or summarizing work that is not your own
 - Quote directly is discouraged
 - DO NOT COPY
- Sources include:
 - Books
 - Journal, magazine, or newspaper articles
 - Interviews
 - Conference Proceedings
 - Lectures

Source Documentation

- Citing
 - Shows your credibility as a researcher
 - Gives proper credit to authors and researchers
 - Protects you from accusations of plagiarism

References

- Asian Institute of Technology Language Center. (2003). *Writing Up Research Guidebook*. Asian Institute of Technology. Retrieved June 9, 2005 from <http://www.clet.ait.ac.th/el21open.htm>
- Chan, S.L., Kitipornchai, S., and Al-Bermani, F.G.A. (1991). Elasto-plastic analysis of box-beam-columns including local buckling effects. *Journal of Structural Engineering*, 117, 1946-1978.
- Halligan, N. (2004). A short course on writing technical reports. *Technical Writing*. Retrieved June 9, 2005 from <http://www.technical-writing-course.com/type-of-technical-report.html>
- Kvam, E. (Personal communication, June 11 2005).