

What is Your Presentation's Abstract?

(about 350 words explaining the research or project)

Summary:

The purpose of this project is to try and build a website that is able to process the data provided by the Excel sheet. Since CMP slurry contains a multitude of different processes, the website is supposed to be able to compare the processes and see which processes are the most efficient and sustainable. The efficiency of the processes is determined by the quality of the product in comparison to the time it takes to produce it, the waste it produces, and the energy consumption of the process.

In Excel, it has a total of 7 processes and they are working to complete the last 2. Each process uses a unique processing step (mixing, calcination, milling, filtration) and chemicals used (oxalic acid, cerium(III) carbonate, cerium carbonate hydrate, cerium oxide). Based on these two factors and many others, we are to present that data and have a graph to represent it.

Abstract:

Chemical Mechanical Planarization (CMP) is a widely used process in producing semiconductor devices like computer chips. Slurry formulations play a key role in determining process efficiency, product quality, and environmental sustainability. This project aims to develop a web-based platform that processes and visualizes CMP slurry data from an Excel dataset, enabling users to compare different slurry processes and identify the most efficient and sustainable options. The platform will assess process efficiency based on several key factors, including product quality, production time, waste generation, and energy consumption.

The dataset currently includes seven distinct CMP processes, with two additional processes under development. Each process involves unique processing steps such as mixing, calcination, milling, and filtration, as well as different chemical compositions, including oxalic acid, cerium(III) carbonate, cerium carbonate hydrate, and cerium oxide. By integrating these variables, the system will generate structured data representations and visual analytics, such as interactive graphs, to facilitate comparative analysis.

This platform is expected to serve a diverse range of users within the semiconductor industry and academic research communities. CMP process engineers will use the system to input slurry usage data and calculate real-time sustainability metrics, optimizing their fabrication processes. CMP slurry designers will benefit from the ability to test virtual formulations for environmental impact before physical production, leading to more sustainable slurry development. Academic researchers will be able to compare novel slurry formulations against industry benchmarks, driving innovation in low-impact slurry design. Additionally, management and decision-makers will utilize the platform's summarized reports and executive dashboards to support procurement decisions for sustainable CMP slurries.

The system will be accessed through a web browser, ensuring ease of use across various devices and locations. With an intuitive interface for data input, analysis, and visualization, this tool will enhance the ability of industry professionals and researchers to assess and improve CMP slurry processes. By providing a comprehensive and data-driven approach to slurry analysis, the platform aims to contribute to more efficient and environmentally responsible semiconductor manufacturing practices.