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Quarterly Progress Report  
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Developing A Sensing System for the Measurement of Oxygen Concentration in Liquid Pb-Bi Eutectic

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Introduction

The design of the new apparatus for oxygen measurement/calibration has been completed. This new apparatus shall be of great importance for the UNLV researchers to conduct the research work in the campus.

Personnel

Principal Investigators:
- Dr. Yingtao Jiang (Electrical and Computer Engineering)
- Dr. Bingmei Fu and Dr. Woosoon Yim (Mechanical Engineering)

Students:
- Mr. Xiaolong Wu, Graduate Student, (Electrical and Computer Engineering)
- Mr. Ramkumar Bhavani Sivaraman (Electrical and Computer Engineering) (On TA)
- Mr. Bin Chen, Graduate Student, (Mechanical Engineering)

Note:
One graduate assistantship was offered to a student. He failed again to obtain appropriate visa to US, however. We have to find the temporary substitute (Mr. Bin Chen) for the FEMLab simulation.

Management Progress

- Expenditures incurred during this quarter are within the target amount allocated.

Management Problems

Some delays have been experienced when dealing with various vendors regarding some of the parts needed in our new apparatus.

Technical Progress

- One paper regarding the new experimental setup is near to complete.
- After consulting the MIT group and engineers from various vendors, we have determined that the following parts shall be used in our new apparatus:
  - Inner crucible from Zircoa Company
  - Outer crucible, stainless steel beaker from VWR
  - High vacuum feedthrough from MDC
  - High vacuum type flange from MDC
  - Heat jacket from Watlow company
- We did some study and calculation on Motor and Shaft design
• We ran FEMLAB to do simulations for oxygen concentration distributions in our setup due to stirring.

Technical Difficulties

• The memory overflow problems continued to trouble us. More memory sticks were purchased to upgrade the computer systems.

Plans for the Next Quarter

• Finish the mechanical drawing of the apparatus for machining.
• Contact various vendors for the shipping of our orders
• Start to assemble the pieces we will receive
• Continue the oxygen concentration simulations using FEMLAB