Introduction of Miyazawa Laboratory

Only University's Laboratory for taking Bachelor, Master, Doctor Degree by Brazing

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1. Research Field

Miyazawa Lab is Joining Science Research Laboratory.

The research field is the joining science. There are some methods in the joining technology and these joining method are chosen by the using material and the necessary function. In the laboratory is studied for the brazing, soldering and diffusion bonding. In addition, the development research of new function material which applied joining technology is also carried out.

2. Research Topics at 2019

- (1) Brazing of Stainless Steel with Ni-based Brazing Filler Metal for Automobile Fabricating Field. Investigation of Crystal Grain Orientation at the Stainless Steel Brazed Joint with EBSD. Estimation of Corrosion Resistance at the Stainless Steel Brazed Joint with Electrochemical Method.
- (2) Brazing of Stainless Steel by Ag-Cu-based brazing filler metal.
- (3) Brazing of Cu & Cu Alloys.
- (4) Observation of Void at the Brazed Joint with X-ray CT Equipment.
- (5) Brazing of Cu alloy and Al alloy.
- (6) Low temperature bonding by nano-Ag particles.
- (7) Brazing of C/C.

3. Research Topics in future

- (1) Ultrasonic wave soldering of glass with special solder.
- (2) Investigation of Brazing Technology with Charcoal at Ancient Egypt times.
- (3) Brazing of WC-Co materials to conventional materials.
- (4) Brazing of ceramics and metallic materials.
- (5) Effect of Current Load to Soldering Joints with Lead Free Solder at Room Temperature.
- (6) Joining of Dissimilar Metal with Spot Brazing Technology.
- (7) Development NEW Joining Method for Fabricating Field.

4. Research Achievement

- (1) Journal Publication & Proceedings of International Conference, 87 academic papers from 2010 to 2019.
- (2) Conference Presentations & Invited Lectures, 142 from 2010 to 2019.
- (3) Collaborative Investigations with Fabricating Companies, 9 Companies.
- (4) I have 280 bachelor graduated students and 113 master graduated students and 13 foreign students for 32 years.
- (5) I have "Grants-in-Aid for Scientific Research (KAKENHI)" and "Grants from Japan Copper and Brass

Association".

5. Staff

- 1 Professor, Miyazawa
- 4 Technicians (Department stuff) including part-time position and 1 Office administrator (Department stuff)

No assistant

9 Mater Students & 10 Bachelor Students

Equipment at our Lab.

BRAZING & JOINING

- 1. Electrical Atmosphere Furnace with Special Loading System for Specimen
- 2. Electrical Atmosphere Furnace and Vacuum Furnace and Vertical Type Furnace with Rotating Special jig.
- 3. In-site Observation System for Brazing
- 4. Spot Brazing System.
- 5. Special Brazing Equipment with Charcoal as a Heat Source for Ancient Egypt Time Brazing.
- 6. Soldering System with Hot Plate equipment.
- 7. Electrical Current Loading System at Room Temperature.

ESTIMATION & ANALYSYS

- 8. Cross-section Observation System,
 - Cutting & Mounting & Polishing & Automatically Polishing & Etching & CP (Ion Polishing) & FIB.
- 9. Observation System, Optical Microscope with CCD camera & SEM & Stereoscopic Microscope.
- 10. Analysis System, SEM+EDX & SEM+EPMA & SEM+EBSD & XRD & X-ray CT.
- 11. Mechanical Properties, Tensile & Fatigue at high temperature & Impact & Hardness at Room temperature.
- 12. Thermal Analysis System, DTA & DSC & TG & TMA.
- 13. Solder Checker.

7. Fundamental Study Topics in Miyazawa's Lab

You will study following topics, which are important metallurgical knowledge and skills, in Miyazawa lab.

- 1. Fundamental of Joining Technology for Fabricating Field
- Fundamental of Brazing & Soldering Technology
- 3. Technical Visit to Some Fabricating or Joining Company if you need
- 4. Fundamental of Analysis Method & Technology
- 5. Practical training of Analysis Method at my university's analytical center with special technician
- 6. Fundamental of Phase Diagrams for Metals & Alloys
- 7. Fundamental of Metallurgy not Materials Science

That's all