Report to APDIC 2023

Activities of association/research group of the alloy phase diagrams in Japan

Alloy Phase Diagram Society
(General incorporated association)

一般社団法人
合金状態図研究会
Alloy Phase Diagram Society

- Chair: H. Ohtani (Toyota Phys. Chem. Res. Inst.)
- Vice chair: I. Ohnuma and T. Abe (NIMS)
- Members: 11 companied and 51 from academia
- Annual meetings and Seminars

The purpose of the association is to promote research on alloy phase diagrams in Japan.

1. To promote collaborations and cooperation among industry and academia.

2. To participate in and cooperate internationally with APDIC.

Domestic Meetings

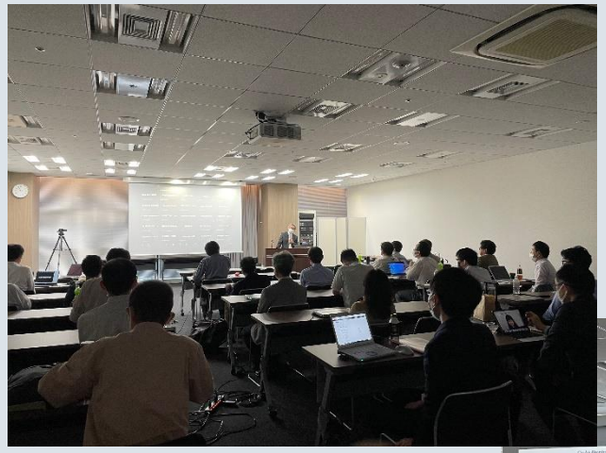
2nd meeting of Alloy phase diagram society
Dec. 9th 2022, (On-line). 18 talks from academia

1. “Prediction of microstructures of alloys by the first-principles phase field method”, K. Ohno, Yokohama National Univ.
2. “Exploration and Ion-Diffusion Mechanism of High Ionic Conductors”, M. Yashima, Tokyo Inst. Tech.
3. “In-situ electrical resistance measurements of Pd under hydrogen atmosphere”, T. Kambayashi, Kanazawa Univ.
4. “Spinodal decomposition in High-Concentration solid solution alloys”, S. Miura, Hokkaido Univ.
5. “Experimental determination of phase equilibria in the Fe-Cr-Mn ternary system”, K. Han, NIMS
6. “Internal nanostructure distribution of multilayered precipitation hardened sheets examined by small angle X ray scattering (SAXS) tomography”, K. Okuda, Kyoto Univ.
7. “Interaction of C/N atoms with substitutional solute atoms and formation of their clusters in α iron”
H. Numakura, Osaka Metropolitan Univ.
8. “Deformation Characteristics of Nb2Co7 as Crystalline Mille-Feuille Structured Substance”, T. Horiuchi, Hokkaido Univ. Sci.
9. “Strengthening by aging at low temperature for Cu-Ni-Al alloy” S. Senboshi, Tohoku Univ.
10. “Experimental determination of MnGe and MnZn binary phase diagrams”, X. Xu, Tohoku Univ.
11. “Construction of Theoretical Phase Diagrams Based on First-Principles Calculation and Study on Metastable Phase Formation”, H. Ohtani, Toyota PCRI
12. “Local atomic configuration and local atomic relaxation”, T. Mohri, Hokkaido Univ.
13. “Stability, Structural and Magnetic Properties of Cantor-derived Alloys: First-principles Study and Extension by Machine Learning”, Y. Chen, Tohoku Univ.
14. “The development of fluoride shuttle battery by Calphad method”, S. Iikubo, Kyusyu Univ.
15. “Applications of the CALPHAD method”
T. Tokunaga, Kyushu Inst. Tech.
16. “Data utilization in materials engineering (for small amounts of data)”, S. Minamoto NIMS
17. “Calculation of grain boundary segregation in polycrystalline materials by CALPHAD method”
I. Ohnuma, NIMS
18. “Construction of Digital Phase Diagram System”, T. Abe, NIMS

Domestic Meetings

3rd meeting of Alloy phase diagram society
May 26th 2023, (Hybrid) in Tokyo.

1. “Otsuki’s dilemma of boundary energy; where is wrong in dislocation theory”, S.R.Nishitani, Kwansei Gakuin Univ.
2. “The effects of lattice relaxations on Cu-Au phase diagram”, T. Mohri, Hokkaido Univ.
3. “Microstructure and mechanical properties for low stacking fault energy Cu-based alloy wires”, S. Semboshi, Tohoku Univ.
4. “Improbable phase diagrams revisit”, T.Abe, NIMS
5. “Robust thermodynamic model for G-phase in steel using sparse modelling”, S. Minamoto, NIMS
6. “Preparation and piezoelectric constant of AlN thin films with simultaneous addition of Mg and W”, K. Hirata, AIST
7. “Investigation on the formation of three-dimensional onion-structure based on spinodal decomposition”, S. Miura, Hokkaido Univ.
8. “Phase stability affected by transition metals and oxygen in Ti-Al alloys”, Y. Gohda, Tokyo Tech.
9. “Hydrogen Evolution Reaction Following the Slater-Pauling Curve: Diagram Indicating Trajectory of Magnetic Dipole Proton from Brownian Random-Walk to Close-Approach Orbit towards Magnetic Catalyst”, M. Morishita, Univ. Hyogo



Seminars

Co-organized seminars

JIM Special seminar Oct. 6th, 2022
“Diffusion analysis from basics to advances”
T. Koyama (Nagoya Univ.)
https://jimm.jp/event/seminar/contents/semi_029.html

JIM Educational Seminar, Oct. 4th-5th, 2022
“Phase diagrams, Phase equilibria and Diffusion”
M. Kajihara (TITech), T. Abe (NIMS), Y. Tsukada (Nagoya Univ.), I. Ohnuma (NIMS)
https://jimm.jp/event/online/

ISIJ web seminar series
“Phase diagrams and Phase transformations”
H. Ohtani (Toyota PCRI), T. Abe (NIMS), et al.
https://isij.or.jp/english/index.html

Research group of Compt. Thermodynamics (placed in Japan institute of metals, JIM)

- Chair: T. Abe (NIMS)
- 53 members from academia and 18 from industry

This group was established to discuss computational thermodynamics behind various phenomena through the construction of phase diagrams based on experiments and theories.
We will conduct theoretical studies of phase diagrams, establish new computational methods based on material informatics, propose methods for estimating phase diagrams, experiments, and machine learning, and study applications of industrial technologies based on phase diagrams. Seminars on the fundamentals of phase diagrams and thermodynamics will be held to educate researchers and engineers in academia and industry.

Activities can be found at https://comptd-jim.org/

Summary: Activities in FY 2022

- Annual Meetings of The Japan Institute of Metals (JIM) x2
- Annual Meetings of The Iron and Steel Institute of Japan (ISIJ) x2
- Meetings of alloy phase diagram society x2
- Seminars on phase diagrams and thermodynamics x3.