



APDIC Report 2024

Italian activity in phase diagram science

Presented by Gabriele Cacciamani



Italy in the world activity on Alloy Phase Diagrams

Evaluated by looking for “Phase diagram and Alloy” in Web of Science
from 1/1/2022 to 31/5/2024

			Papers	Report	Report
			2023	2022	
World literature			1496	1683	1619
Ranking	1	China	580	586	513
	2	USA	195	255	245
	3	Russia	143	173	171
	4	Germany	124	146	152
	5	Japan	117	151	152
	...				
	20	Italy	17	22	24
	...				



Recent Papers by
researchers from

**University
of Genova**

and

**CNR-ICMATE
Genova**

- 2024 L. Fenocchio, S. Gambaro, G. Cacciamani
Critical Assessment of phase equilibria in the Al-Co-Ta and Al-Ni-Ta systems JPED submitted
- S. Gambaro, L. Fenocchio, F. Valenza, P. Riani, G. Cacciamani
Combined experimental and CALPHAD investigation of equimolar AlCoCrFeNiX (X=Mo,Ta,W) High-Entropy Alloys CALPHAD accepted
- R. Freccero, L. Arrighi, G. Cacciamani, P. Riani
The 500°C Isothermal Section of the Al-Fe-Pr Ternary System JPED in press
- M. Palumbo, E. M. Dematteis, L. Fenocchio, G. Cacciamani, M. Baricco
Advances in CALPHAD methodology for modelling hydrides: a comprehensive review JPED in press
- 2023 G. Cacciamani, L. Fenocchio, L. Dreval
Carbon-Cromium-Tantalum in MSI Eureka, Watson, A. (Ed.) by MSI, Stuttgart, **99**, 10.18397.1.4 (2024),
<https://doi.org/10.7121/msi-eureka-10.18397.1.4>
- G. Cacciamani, L. Fenocchio, L. Dreval
Al-Fe-Ni Ternary Phase Diagram Evaluation MSI-Eureka 10.10205.3.7
- Valenza, F; Gambaro, S; Bigos, A; Czaja, P; Janusz-Skuza, M; Wojewoda-Budka, J
Wetting and interfacial reactivity of graphite by liquid TiCuNi
SURFACES AND INTERFACES 2023 41 103323 <http://dx.doi.org/10.1016/j.surfin.2023.103323>
- 2022 M. Ostrowska, P. Riani, B. Bocklund, ZK Liu, G. Cacciamani
Thermodynamic modeling of the Al-Co-Cr-Fe-Ni high entropy alloys supported by key experiments
JALCOM 897 (2022) 162722 <https://doi.org/10.1016/j.jallcom.2021.162722>
- S. Gambaro, F. Valenza, M.L. Muolo, A. Passerone, P. Riani, G. Cacciamani
Zirconia-high entropy alloys joints for biomedical applications: The role of Ag-based fillers on interfacial reactivity JALCOM 909 (2022) 164764 <https://doi.org/10.1016/j.jallcom.2022.164764>



Recent Papers by researchers from

Other Italian Institutions

- 2023 Pourgharibshahi, M; Timelli, G
Surface-segregation mediated Mg₂Si and Mg(Zn,Cu,Al)₂ formation on primary α -Al phase during solidification of the hot-tear sensitive AA 7xxx aluminum alloys
MATERIALS TODAY COMMUNICATIONS 2023 **36** 106803 <http://dx.doi.org/10.1016/j.mtcomm.2023.106803>
- Malagutti, MA; Lohani, K; D'Incau, M; Nautiyal, H; Ataollahi, N; Scardi, P
Optimizing CuFeS₂ Chalcopyrite Thin Film Synthesis: A Comprehensive Three-Step Approach Using Ball-Milling, Thermal Evaporation, and Sulfurization Applied for Thermoelectric Generation
APPLIED SCIENCES-BASEL 2023 **13** 10172 <http://dx.doi.org/10.3390/app131810172>
- Lapinski, M; Koziol , R; Skubida, W; Winiarz, P; Elhassan, RMY; Sadowski, W; Koscielska, B
Transformation of bimetallic Ag-Cu thin films into plasmonically active composite nanostructures
SCIENTIFIC REPORTS 2023 **13** 10107 <http://dx.doi.org/10.1038/s41598-023-37343-2>
- Stagno, V; Bindi, L
Quasicrystals at high pressures and temperatures: a review
RENDICONTI LINCEI-SCIENZE FIS. E NAT. 2023 **34** 727 <http://dx.doi.org/10.1007/s12210-023-01183-z>
- 2022 Scaglione, F; Arnaboldi, S; Viscardi, C; Baricco, M; Palumbo, M
Solidification Calculations of Precious Alloys and Al-Base Alloys for Additive Manufacturing
METALS 2022 **12** 322 <http://dx.doi.org/10.3390/met12020322>
- Balart, MJ; Gao, F; Patel, JB; Miani, F
The Role of Dilute Solute Additions on Growth Restriction in Cu-, Al-, Mg- and Ti-Based Alloys
METALS 2022 **12** 1653 <http://dx.doi.org/10.3390/met12101653>
- Chèze, C; Riva, FR; Di Bella, G; Placidi, E; Prili, S; Bertelli, M; Fattorini, AD; Longo, M; Calarco, R; Bernasconi, M; Kheir, OA; Arciprete, F
Interface Formation during the Growth of Phase Change Material Heterostructures Based on Ge-Rich Ge-Sb-Te Alloys
NANOMATERIALS 2022 **12** 1007 <http://dx.doi.org/10.3390/nano12061007>



Recent Papers by
researchers from

Other Italian Institutions

2022 Della Pia, F; Alfè, D
Beta1-beta2 phase transition of ferropericlase at planetary interior conditions
PHYSICAL REVIEW B 2022 **105** 13 <http://dx.doi.org/10.1103/PhysRevB.105.134109>

Bonfà, P; Chicco, S; Cugini, F; Sharma, S; Dewhurst, JK; Allodi, G
Magnetic phase diagram of the austenitic Mn-rich Ni-Mn-(In, Sn) Heusler alloys
ELECTRONIC STRUCTURE 2022 **4** 024002 <http://dx.doi.org/10.1088/2516-1075/ac5fb9>

Belelli, F; Casati, R; Andrianopoli, C; Cuccaro, F; Vedani, M
Investigation and characterization of an Al-Mg-Zr-Sc alloy with reduced Sc content for laser powder bed fusion
JOURNAL OF ALLOYS AND COMPOUNDS 2022 **924** 166519
<http://dx.doi.org/10.1016/j.jallcom.2022.166519>

Tamayo, DV; Brollo, GL; de Oliveira, JR; Miani, F; Zoqui, EJ
The Thixoforming Process Window for Al-Si-Zn Alloys Using the Differentiation Method: The Role of Si, Heating Rate and Sample Mass
METALS 2022 **12** 734 <http://dx.doi.org/10.3390/met12050734>

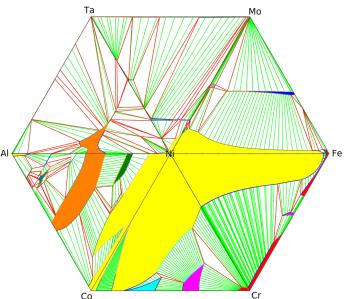
Autieri, C; Cuono, G; Noce, C; Rybak, M; Kotur, KM; Agrapidis, CE; Wohlfeld, K; Birowska, M
Limited Ferromagnetic Interactions in Monolayers of MPS₃(M = Mn and Ni)
JOURNAL OF PHYSICAL CHEMISTRY C 2022 **126** 6791 <http://dx.doi.org/10.1021/acs.jpcc.2c00646>



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GHEA (Genoa High Entropy Alloys) thermodynamic database

A thermodynamic database for high temperature HEAs and Superalloys under continuous development

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**University
of Genova**

At present GHEA includes **15 elements** (Al, B, C, Co, Cr, Fe, Mo, Ni, Re, Si, Ta, Ti, W, Y) and more than **200 phases** modelled with particular attention to the consistency between thermodynamic model and crystal structure.

Selected 5- 6- and 7-component subsystems are fully assessed: in particular **Al-Co-Cr-Fe-Ni** combined with **Mo, Ta, W, C**.

A paper about GHEA is in preparation.



Thank you for attention