

INTERPHASE $\beta' \rightarrow \zeta$ TRANSFORMATION OF THE CASTING
ALLOYS IN Ag-Zn SYSTEM 27-48 wt%Zn

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Abstract: The results of thermal dilatometric investigation by quenched alloys 265^o and 285^o to 0^oC, confirm the existence of metastable β' -phase in a pretty large composition interval 29-46 wt%Zn, as well as the temperature of 110^oC or > 110^oC as a temperature of $\beta' \rightarrow \zeta$ -phase transformation.

From the experimental results of the relative dilatation $\frac{\Delta l}{l}$ - temperature dependence, the dependence $\frac{\Delta l}{l}$ - concentration Fig.1 i.e. isotherms for the different temperatures are plotted. Over the isotherms, the phase diagram of the mentioned composition interval is projected.

It is evident that:

- the interisotherm distance is nearly constant till 110^oC, between 286^oC and 300^oC, and a large or narrow composition intervals between a numerous number of isotherms, because of linearity in the dependence $\frac{\Delta l}{l}$ - temperature for different alloys.

- in composition intervals where the interphase $\beta' \rightarrow \zeta$ transformations take place, there are increase or decrease of interisotherm distances. The variations of interisotherm distances from 110^oC to 170^oC result from $\beta' \rightarrow \zeta$ transformation, while the variations of the distance between the isotherms 250^o-262^oC, or between 274^o-286^oC are in relation to the interphase transformations in the mentioned temperature interval.

- For different concentrations of Zn in alloys the large interisotherm distances between 29-46 wt%Zn is related to $\beta' \rightarrow \zeta$ transformations, are in different temperature intervals.

- if distance between the isotherms 110^oC and 170^oC

i. e. $\left(\frac{\Delta I}{I}\right)_{170} - \left(\frac{\Delta I}{I}\right)_{110}$ arbitrary is a measure for retained metastable β' -phase by the quenching of the alloys as it is seen on Fig.2 (curve A) there is pretty good correlation with Ag-Zn phase diagram maximums on eutectoid and peritectoid concentrations ② and ③, and minimums by points ③ and near the point ④.

Minimal retains of β' -phase is on peritectoid concentration (point 5) i.e. on the 50 at%Zn (38,2 wt%Zn), the alloy which from this aspect was predominantly object of β' the previous investigations [1-8]. For further interest is the maximum between the points ③ and ④.

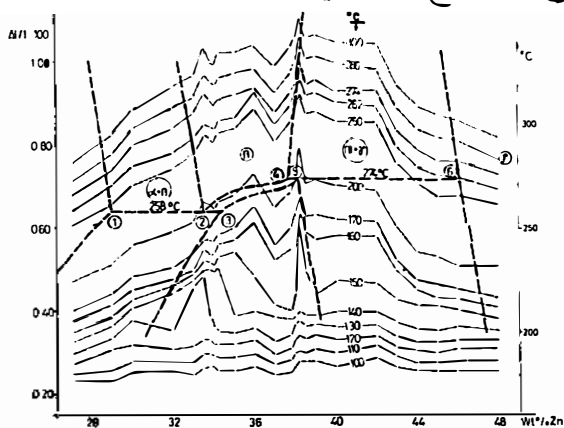


Fig.1

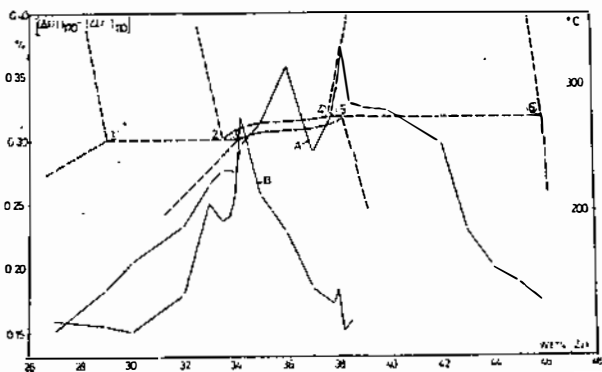


Fig.2

The curve B (Fig.2) is related to the thermal untreated alloys [9]. In comparison with curve A, it is evident:

- the narrow composition interval of existence of β' -phase.
- good expressed maximum on 34 wt%Zn (point 3) , and very feeble maximum on 38 wt%Zn (point 4).

REFERENCES

1. Von J. Weerts, Z. Metallkde, 11(1932)265, 2. W.J. Kichingman, Acta Mett, 10(1962)799, 3. H. McL. Clark. E.A. Merriman and C. H. Wayman, Acta Mett, 17(1967)719, 4. R. I. Orr and J. Rovel, Acta Mett, 10(1962)935, 5. Von W Köster, Z. Metallkde, 6(1940)151, 6. H. Hansen and A. Anderko, Constitution of binary alloys, "McGraw" London 1958, pp 62-66, 7. Metals Handbook, 3(1973)256, Am. Soc. for Met., Ohio, 8. S. Noguchi Jour. of Phys. Soc. of Japan, Vol. 117, No 12(1962), 9. G. Mavrodiev and M. Pukarova-Jurukovska, VI Cong. of MFA of SFRJ, Novi Sad 1975 .