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# Al-Pd-Ti (Aluminum-Palladium-Titanium)

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A partial isothermal section for Pd-poor alloys at 950 °C was reported for this system by [2000Din].

## Binary Systems

The Al-Pd phase diagram [2003Oka] depicts eleven intermediate phases. Only one of them, PdAl (CsCl-type cubic, denoted β in [2003Oka]) is present at 950 °C in the composition range studied by [2000Din]. An update of the Al-Ti system appears in this issue. The Pd-Ti phase diagram [1993Oka] contains a number of intermediate phases. In the composition range studied by [2000Din] at 950 °C, only (βTi) is present.

## Ternary Compounds

[2000Din] reported three ternary compounds in this system at 950 °C: $\tau_1$ [(Ti,Pd,Al)(Ti,Pd,Al)$_3$] with the AuCu$_3$-type cubic structure ($a$ = 0.39575 nm) around the composition $Ti_{26}Pd_{13}Al_{61}$, $\tau_2$ [(Ti,Al)$_6$(Ti,Pd,Al)$_{23+1}$] with the filled $Mn_{23}Th_6$-type cubic structure ($a$ = 1.22295 nm) close to the composition $TiPdAl_2$, and $\tau_3$ [(Ti,Pd)(Ti,Pd,Al)$_2$] with the $MgZn_2$-type hexagonal structure ($a$ = 0.51330 nm and $c$ = 0.82603 nm) with a homogeneity range of $Ti_{36.7}Pd_{24}Al_{39.3}$-$Ti_{34.3}Pd_{17.7}Al_{48}$ compounds. In the above, a complicated multiatom substitution is seen, without a specific site-atom association known in the given structure types. Detailed structural data are listed by [2000Din].

## Isothermal Section

With starting metals of >99.9% purity, [2000Din] arc melted or induction melted about 20 ternary alloy compositions with the Pd content up to 25 at.%. The final anneal was at 950 °C for 240 h, followed by water quenching. The phase equilibria were studied by metallography, x-ray powder diffraction, and electron probe microanalysis. The partial isothermal section constructed by [2000Din] at 950 °C is redrawn in Fig. 1 to agree with the accepted binary data. The solubility of Pd in Ti-Al phases is up to 2.5 at.%. The body-centered cubic (bcc) phase (βTi) orders to the CsCl-type $B2$ structure in the ternary region. No tie-lines form between TiAl (γ) and $\tau_2$ at this temperature.

### References

**1993Oka:** H. Okamoto, Pd-Ti (Palladium-Titanium), *J. Phase Equilibria,* Vol 14 (No. 1), 2000, p 128-129

**2000Din:** J.J. Ding, P. Rogl, B. Chevalier, and J. Etourneau, Structural Chemistry and Phase Relations in Intermetallic Systems Ti-{Pd,Pt}-Al, *Intermetallics,* Vol 8, 2000, p 1377-1384

**2003Oka:** H. Okamoto, Al-Pd (Aluminum-Palladium), *J. Phase Equilibria,* Vol 24 (No. 2), 2003, p 196

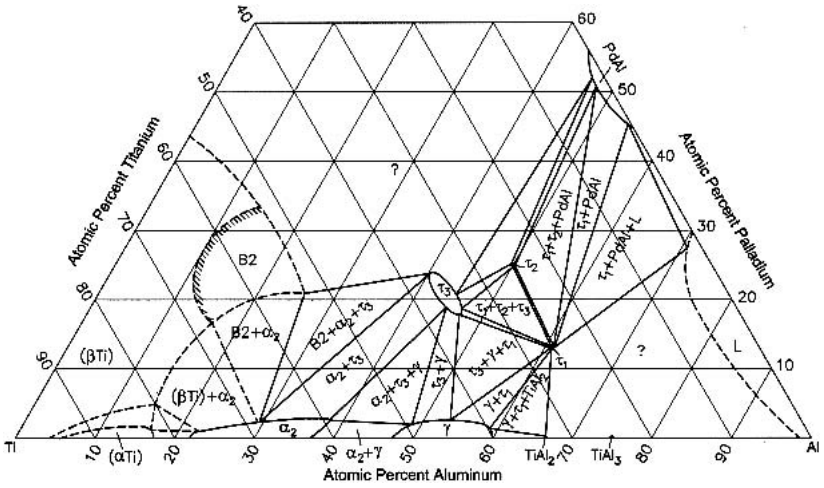


**Fig. 1** Al-Pd-Ti partial isothermal section at 950 °C for Pt-poor alloys [2000Din]