

DISCUSSION

C. E. Coleman¹ (written discussion)—Please place the work on high tin concentration into the context of India's alloy development for fuel sheathing and pressure tubes.

S. L. Wadekar et al. (authors' closure)—This preliminary work on zirconium alloys with high tin concentration is mainly for studying the role of tin in solution hardening and precipitation hardening of zirconium alloys. We have not carried out any work on development of binary Zr-Sn alloys for fuel sheathing and pressure tube applications.

B. Cox² (written discussion)—Past work on the Zr-Sn system shows that the precipitation of Zr-Sn intermetallics is very sluggish and that long anneals are necessary in order to observe them. Other work shows that it is difficult to keep tin in solution during thinning of E.M. foils, and that tin commonly precipitates on foil surfaces resulting in artefacts. Are you concerned that your observations may be the result of such artefacts, since they seem to be at variance with other published work? Do you have stereo TEM photographs that prove that Zr-Sn phases are within rather than at the surfaces of the foils?

S. L. Wadekar et al. (authors' closure)—We have seen that the volume fraction of the precipitate phase increases with tempering time. This observation clearly shows that the microstructural changes reported in the paper arise from the tempering operation and are not due to surface precipitation during thinning which is carried out at 223 K. Diffusivity of Sn at such a low temperature is too small to cause migration of Sn atoms to the surface even when a foil of less than 100 nm is considered.

K. L. Murty³ (written discussion)—Do you have $\sigma - \epsilon$ curves and do they exhibit dynamic strain aging?

S. L. Wadekar et al. (authors' closure)—Dynamic strain aging is indicated in the flow stress versus temperature plots. Serrated flow behavior was also observed in Zr-1.5Sn at certain temperature and strain rate ranges.

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