## DISCUSSION

*Ph.B. van Asbroeck*[1]—Irradiation experiments carried out at C.E.N./S.C.K., Mol, Belgium, under higher fast fluences than those reported by A. L. Lowe, Jr., and C. J. Baroch show that 19-9DL is still less susceptible to elevated-temperature embrittlement than austenitic stainless steel.

19-9DL solution annealed 15 min at 1050 C and aged 1 h at 760 C, AISI 316 solution annealed 15 min at 1050 C, and Incoloy-800 annealed 15 min at 980 C in the form of tension plate specimens (0.5 mm thick) have been neutron irradiated at 60 C in BR2 up to a fast fluence of 2.65 n/cm$^2$, $E>0.1$ MeV, 1.30 n/cm$^2$, $E>1$ MeV, and a thermal fluence of 2.4 n/cm$^2$. Total elongation at 700 C (Table 1 of the discussion) has been measured by postirradiation tension testing at a strain rate of $5\times10^{-3}$ min$^{-1}$. The analysis of the table indicates a levelling of the total elongation decrease between a fast fluence of 1.2 and $1.9\times10^{21}$ n/cm$^2$, $E>0.1$ MeV Tension tests on specimens irradiated at a fast fluence greater than $10^{22}$ n/cm$^2$ are under way and will check this levelling.

Furthermore if the ratio of the total elongation before irradiation to the total elongation after irradiation is taken as a measure of the susceptibility to high-temperature embrittlement, statistical testing leads to the conclusion that this susceptibility is different for the three alloys at a 5 percent level of significance. The value of this susceptibility to high-temperature (700 C) embrittlement is about 2.6 for 19-9DL, 4.3 for AISI 316, and 9.0 for Incoloy-800.

TABLE 1—*Total elongation at 700 C (strain rate=$5\times10^{-3}$ min$^{-1}$; irradiation temperature=60 C).*

| Fast Fluence, $E>0.1$ MeV, n/cm$^2$ | Total Elongation, % | | |
|---|---|---|---|
| | 19-9DL | AISI 316 | Incoloy-800 |
| 0 | 58.5, 63.5, 68.0 | 68.0, 70.0, 72.5 | 71.0, 72.5, 77.6 |
| $1.20\times10^{21}$ | 26.7, 28.6, 35.5 | 19.0, 19.1, 22.0 | 10.0, 11.4, 11.4 |
| 1.90 | 22.4 | 20.5 | 7.1 |
| 2.30 | 23.4 | 16.9 | 7.6 |
| 2.50 | 20.0, 24.8 | 15.3, 22.9 | 8.1, 9.1 |
| 2.65 | 19.6, 24.9, 26.3, 27.7 | 10.5, 11.9, 11.9, 17.6 | 7.2, 9.3, 10.2 |

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