Some Studies on Irradiation Creep of Graphite

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Studies of the irradiation induced creep of graphite in the reactor BR-2 have been described previously for a large number of specimens under constant compressive stress and a few tensile specimens. Further creep data have been obtained on specimens under constant tensile loads, and include those from specimens irradiated over a wider range of temperatures. Thermal annealing experiments of both tensile and compressive creep strain up to temperatures greater than $2000^\circ C$ have also been carried out.

It is shown that over a fast neutron dose range of $50 \times 10^{20}$ n.cm$^{-2}$,

(i) near isotropic graphites from different sources have substantially the same creep behaviour.

(ii) there is no difference in creep strain between specimens irradiated at $650^\circ C$ and specimens irradiated at $400^\circ C$.

(iii) there is no significant difference between tensile and compressive creep behaviour over the dose range examined.

Specimens containing compressive and tensile creep strain do, however, show a different behaviour on thermal annealing. There is a large apparent recovery of compressive creep strain on annealing at temperatures greater than $2000^\circ C$, but a comparatively small recovery of tensile creep strain. These results are discussed in terms of current ideas on dimensional changes in graphite.