pressure-induced development of dislocations at elastic discontinuities in tungsten and copper. The principal results and conclusions are:

(1) In tungsten containing second-phase particles of thoria or hafnium carbide, the formation of pressure-induced dislocations at particles occurs for applied pressures which are lower than those predicted from the simple mathematical model. It is shown that additional stress concentrations from irregularities on the particle surfaces, possibly assisted by residual thermally-induced stresses, could account for these differences.

(2) The magnitude of the applied pressure found to be necessary to develop dislocations at the particles precludes multiplication of pre-existing dislocations as the relevant mechanism.

(3) For copper containing helium-filled internal cavities, the magnitude of the externally applied pressure required to develop dislocations at the cavities is in reasonable agreement with that computed from the model.

(4) The observed development of pressure-induced dislocations at cavities in copper supports earlier interpretations of pressure-induced permanent changes in the internal friction characteristics of aluminium as being due to localized plastic-deformation at cavities.

(5) For both tungsten and copper, the development of pressure-induced dislocations is observed to depend strongly on the size of the discontinuity. This result is shown to be in reasonable agreement—particularly for the case of cavities in copper—with computation of the size dependence of the energy necessary to nucleate a stable dislocation loop at a discontinuity.

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