by the increase or decrease of mean lattice parameter) is the controlling factor. If this were the case then silicon, which contracts the lattice, should counteract the effect of manganese, which expands the lattice. This is not so, for the effect of these elements is additive. The average dilation of the lattice is merely an average measure of the local distortion around each solute atom, and hence a measure of the binding energy between dislocation and solute atom[3].

One of the difficulties associated with this model is the fact that carbon and nitrogen give rise to an anisotropic strain and produce localized tetragonality, whereas substitutional elements such as silicon and manganese produce an isotropic strain. Nevertheless, it is interesting to observe that the change in yield strength, or more particularly, the change in the frictional contribution to σ_0, is directly proportional to the concentration of solute, at least in dilute solutions, and that the ratio of the change in lower yield point to the lattice distortion is approximately the same for both substitutional and interstitial solutes.

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T. GLADMAN

Swinden Laboratories,
United Steel Companies Ltd.,
Moorgate,
Rotherham.

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Flow of Cadmium under Very Small Stresses

AT room temperature cadmium is very much more resistant to plastic deformation than lead, as can easily be proved by trying to bend permanently by hand rods or bars of the two metals, of like dimensions. For example, a bar of cadmium 18 cm. long by 1·5 by 0·6 cm. cannot be perceptively bent by hand with ordinary effort, while a similar bar of lead bends as much as is desired extremely easily.

However, under very small stresses applied for a long time, which have no effect on lead, cadmium yields markedly. This is, perhaps, most strikingly shown by arranging a bar as a horizontal cantilever so that it is subject to a bending movement due to gravity alone. The photograph shows a bar of lead and a bar of cadmium, of the dimensions given above, which were clamped at the right over a distance of 3 cm. and left for 14 weeks at room temperature. There is no perceptible distortion of the lead, but the cadmium has yielded in the manner shown and is still yielding.

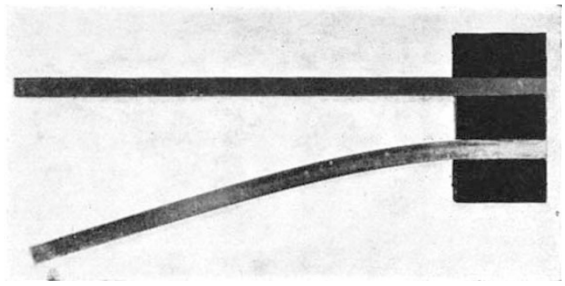

Fig. 1 Lead (above) and cadmium (below) 14 weeks under gravity

A sixpence left between two horizontal plates of cadmium, the upper of which supported a weight of 55 kgm., made little indentation in 20 hr.; but in the course of 6 weeks effected a clean cut intaglio of both sides of the coin.

Dr. D. Aboav, who is working on the creep of cadmium under simple shear by the method already described[1], has found flow at a rate of 4×10^{-3} per cent shear strain per hour under a shear stress of 100 gm. wt./mm.^{2} and has detected flow at stresses as low as 10 gm. wt./mm.^{2}. The magnitude and the type of flow, whether $t^{1/2}$, linear with time or compounded of both, is intimately connected with grain size.

Zinc is being investigated for the effect.

E. N. da C. ANDRADE

Department of Metallurgy,
Imperial College of Science and Technology,
London, S.W.7.

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CHEMISTRY

Viscosity Dependence of Unimolecular Conversion from the Triplet State

THE dependence of triplet state lifetimes on solvent viscosity noted in the first studies of triplet states in solution[1] is due, in part, to quenching by trace impurities not yet identified[2,3]. Hoffman and Porter[3] showed that, in certain molecules containing heavy atom substituents, the radiationless transition probability is increased to the point where it predominates over these trivial quenching processes and they conclude that, under these conditions, the measured lifetime corresponds to a true unimolecular radiationless conversion to the ground-state.

In the particular case of 9,10-dibromoanthracene, where quenching effects were negligible, the unimolecular decay constant was found to be independent of solvent viscosity in the range 1 (*cyclo*hexane) to 170 (liquid paraffin) centipoise at room temperature. On the other hand there was evidence that the

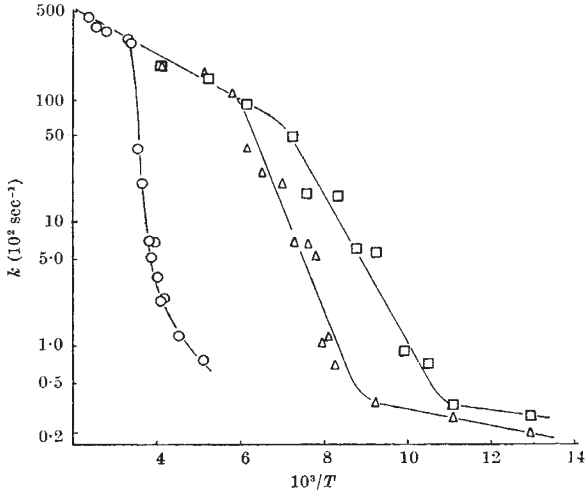

Fig. 1. Plot of logarithm of first-order rate-constant for triplet decay of 9,10-dibromoanthracene against reciprocal of absolute temperature. Solvents: propylene glycol (○); 3-methyl pentane (△); isopentane (□)