

quantities and are of far less significance than the fact that neither the correct magnitude of temperature coefficients nor the correct relative magnitude of the rate constants are predicted. Calculations of *IM* energies from second virial coefficients are carried through on the assumption that the iodine atom has the same properties as xenon and use of the geometrical mean combining rule. The absolute magnitude of the calculated interaction energy could be increased by assuming that the iodine atom has a much higher polarisability than xenon but no matter what properties of iodine are assumed the observed relative values of *IM* interaction energies cannot be reproduced.

The phenomena are too general to be interpreted in terms of specific chemical forces and we believe that the explanation is to be found in terms of a charge transfer complex between the iodine atom and the chaperon. No satisfactory quantitative theory of charge transfer forces has yet been developed but the theory of Matsen *et al.*⁸, and the limited experimental results on charge transfer complexes involving the iodine molecule in solution indicate that energies between one and five k.cal. are not unreasonable for charge transfer complexes between the gases studied and a species with high electron affinity, such as the iodine atom.

The question as to whether the complex mechanism and the charge transfer theory are generally applicable to other atom recombination reactions and perhaps to some radical recombination reactions must wait further experimental data. Although the energy of formation of charge transfer complexes by other atoms will generally be less than those of iodine, we shall expect that in many other cases the complex mechanism of recombination will play a significant part.

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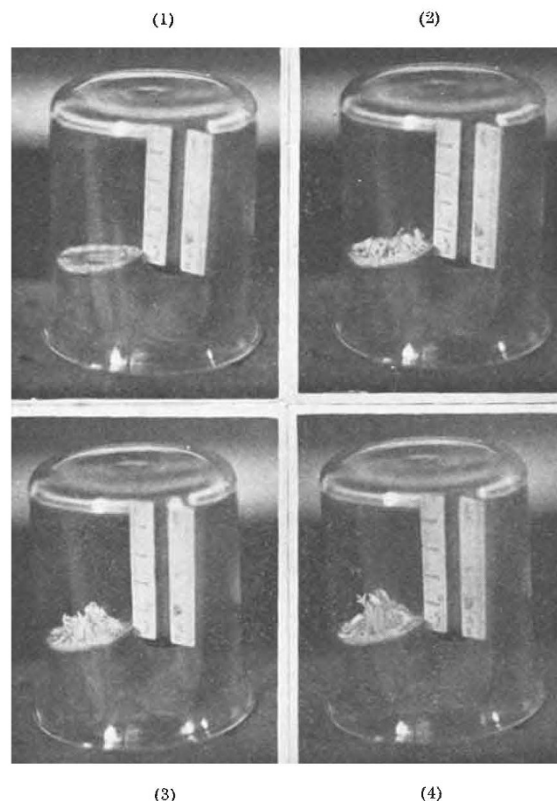
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Primer Explosion Triggers Reaction

RECENTLY, when making certain experiments with the fuses for trench mortar shells, a thin (0.1 mm.) disk of pure aluminium was placed between the primer and the detonator. It was noticed that, immediately after this disk was pierced by the gases of the exploding primer, a white mass started to grow on the aluminium surface around the hole, and this growth continued to expand most vigorously for about 12–15 min.

Figs. 1–4 show consecutive stages of this reaction. After about 10 min. (Fig. 4) the fragile structure started to collapse under its own weight.

The disk was placed under an inverted beaker to protect the delicate growth from air currents. In some cases those 'feathers' reached a height of



about 20 mm. before collapsing and resembled greatly in shape the delicate sea anemones. The primer charge consisted of, approximately, 50 mgm. of the usual priming mixture containing mercury fulminate, potassium chlorate and antimony sulphide.

The mechanism of this reaction is, apparently, as follows: vapours of mercury formed at the moment of explosion ($\text{Hg}(\text{CNO})_2 = \text{Hg} + 2\text{CO} + \text{N}_2$), are condensed as tiny droplets on the cold aluminium surface; in presence of the moisture of air an energetic electrochemical action starts at those points where two metals are in intimate contact and aluminium is readily converted into its hydroxide— $\text{Al}(\text{OH})_3$.

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A New Approach to Carbon Gasification

TERMS such as 'active sites' and 'active centres' have long been used in describing the reactions of carbons with gases, without any specific knowledge of either the real nature or real function of such 'sites'. Recent work in these Laboratories has thrown some light on both nature and action of at least one common type of reactive centre.

A series of chars was produced from *Eucalyptus marginata*. These samples contained varying amounts of oxygen depending on the temperature of charring. When this oxygen was determined by heating the char in a stream of purified nitrogen at 1,250° C., it was liberated partly as carbon dioxide and partly as carbon monoxide. The greater part of the oxygen, liberated as carbon monoxide, represents oxygen groupings in