To distinguish between these two possibilities ^{14}C-benzaldehyde was added to the reaction mixture and its behaviour with time was followed by means of scintillation counting (8). As the reaction proceeded the ^{14}C-benzaldehyde concentration decreased, showing that the consecutive mechanism (*a*) was operative and that the poison affected step (2).

In another study using scintillation counting, the effect of catalyst poison on chemisorption has been investigated (9). The adsorption and hydrogenation of vinylacetic acid and crotonic acid, both ^{14}C-labelled, were studied first on an unpoisoned Pd-$BaSO_4$ catalyst, and then on a thiophen poisoned Pd-$BaSO_4$ catalyst. The results showed that, although the thiophen-poisoned catalyst was inactive for hydrogenation, the amount of adsorption was unaffected by the presence of poison. These were taken to indicate that while adsorption occurred generally on all surface sites, only a small fraction of the sites were active for hydrogenation. Only these latter sites were affected by the poison.

This heterogeneity of catalyst surfaces is easily detectable by tracer methods. For such studies a displacement method, in which Hg labelled with ^{197}Hg and ^{203}Hg displaces hydrogen and then tritium from metal films, has been devised (10). Thermal desorption of ^{203}Hg has also been used (11) to investigate the surface heterogeneity of an asbestos-supported platinum catalyst.

Labelled Surfaces

In the applications so far discussed the radioactive atoms have been incorporated in the adsorbate rather than in the adsorbent. However, labelled surfaces themselves may also be used. In a study of the reaction between hydrogen and oxygen over platinum, Jech (12) used a platinum sponge and a platinum foil, whose surface had been labelled with ^{85}Kr, ^{131}Xe or ^{222}Rn. The surface labelling was achieved by impelling the inert gas atoms into the surface as ions under a potential drop. The results of this study showed that radioactive gas was liberated from the surface as the reaction proceeded. From the activities before and after reaction it was possible to show that only a fraction of the surface was catalytically active. The potentialities of this technique are large, since this method of surface-labelling is almost universal.

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The Selection and Use of Thermocouple Sheaths

Without adequate protection from the relatively few substances that can contaminate them, platinum thermocouples can deteriorate rapidly. Given such protection, in the form of a carefully chosen refractory sheath properly looked after, they will give long and reliable service at high temperatures often in apparently adverse conditions. The subject of sheath materials and design is a somewhat neglected one, and it is valuable to have available a survey of the variety of old and newer sheath materials that can be used in the many applications of thermocouples in metallurgical processes. D. W. Brown, of Morganite Research and Development, has provided such a review (*J. Inst. Metals*, 1967, **95**, 12–17), together with useful guidance on such important details as the size and positioning of sheaths in various types of furnaces and their careful handling in service.