further 200 to 300 hours of heating and cooling. The lifetime is considerably less for materials that cause distortion; 10 to 15 growth cycles could be considered good for yttrium aluminium garnet and a much greater number would be exceptional without some form of repair. Durability does not necessarily decrease with increasing crucible size but increases in wall and base thicknesses are beneficial for large crucibles, e.g. those of more than 100 cm^3.

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The Detection of Breath Alcohol

PLATINUM ELECTRODES IN FUEL CELL SENSOR

The development of a fuel cell detector sensitive to alcohol in the breath has led to the production of a small portable instrument as a preliminaty screening test for traffic law enforcement. A similar sensor is incorporated into a more accurate analytical instrument now in use in some countries for final evidence in place of blood and urine analysis.

These instruments are produced by Lion Laboratories Limited of Cardiff following extensive research at Innsbruck University under Professor Gruber and more recently by Dr T. P. Jones at the University of Wales Institute of Science and Technology, Cardiff.

The fuel cell sensor incorporates a phosphoric acid electrolyte and electrodeposited platinum on its electrodes. Breath instruments with this sensor aspirate alveolar breath directly on to one fuel cell electrode where, as a fuel, it is oxidised catalytically on the platinum. The small current which is generated is amplified and displayed on an analogue or a digital meter or as a printout.

Fuel cell output has been found to vary linearly with blood alcohol concentration over the range of forensic interest. Sensor activity diminishes slowly with time but by occasional calibration checks a sensor can remain in operation for up to 12 months irrespective of the number of samples analysed. The sensor is specific only to alcohol in expired breath but it will respond in other locations to certain other fuels, e.g. alcohols, acetaldehyde and hydrogen.

The pocket size Alcolmeter produced by Lion Laboratories incorporates a fuel cell sensor with platinum electrodes for the detection of breath alcohol. The more accurate analytical instrument can be seen in the background