

CONTROLLED GOLD DOPING OF SILICON BY USING ION IMPLANTATION

M. Schulz, A. Goetzberger, I. Fränzl and W. Langheinrich (F.R. Germany)

A new technology is suggested to dope silicon devices with gold for carrier life time adjustment with high accuracy and reproducibility. Ion implantation is used to dope the sample with a well defined total amount of gold. This gold dose is redistributed by high temperature anneal. A computer simulation of gold diffusion and experimental radio tracer results show that highly accurate gold doping can be obtained in bulk material when temperatures around 1000°C are applied during the redistribution anneal. Damage free surfaces must be used to reduce the gold content gettered in surfaces.

TUNABLE COHERENT LIGHT SOURCES

J. Kuhl and W. Schmidt (F.R. Germany)

The physical principles of tunable sources of coherent light are briefly described. Characteristic data and the present stage of development are reviewed.

A SIMPLE POSITRON LIFETIME SYSTEM SUITABLE FOR LOW DENSITY GASES

P.G. Coleman, T.C. Griffith, G.R. Heyland and T.L. Killeen (United Kingdom)

A conventional positron lifetime system is described which gives data of high statistical accuracy and is especially suitable for gases at low density. Several factors contribute to the significant improvement in performance.

The fraction of positrons annihilating in the gas is greatly enhanced by backscattering, and the small dimensions of the pressure vessel coupled with large plastic scintillators yields about 1200 coincidence events per second. Simple electronics are used with no side channel gating, and very clean spectra are obtained with overall resolution better than 1.5 nsec. The true start and stop pulses are counted, which enables the data to be treated by the authors' signal restoration method.

The results of measurements in Ar-CO mixtures and data for H₂ and D₂ are presented and discussed.

TEMPERATURE DISTRIBUTION OF MAGNESIUM FLAMES

F. Rössler (France)

Methods used in the past for calculating the radiation properties of flames with diffusing particles were employed in the investigation of oxygen/city gas flames containing magnesium oxide particles. In the first case oxygen was injected through the central nozzle, whereas

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in the second case the gas introduced through this nozzle was city gas. A common feature to all experiments was that magnesium has been supplied simultaneously through the central nozzle. Both types of flame differ with respect to their temperatures. These temperatures have been determined starting from measurements of both the colour temperature and luminance temperature. It was surprising to see that the temperature of the first type of flame showed a minimum at the centre of the flame. This minimum was not observed in the flame of the second type. The results are discussed, and information about the combustion process is offered.

POSITRON TRAPPING MEASUREMENTS OF HIGH PRECISION USING A LABELLING TECHNIQUE

I.K. MacKenzie and P.C. Lichtenberger (Canada)

The small effects associated with positron trapping in metal defects are masked in practice not only by inherent statistical fluctuations, but also by electronic instabilities. The unique directional correlation of annihilation quanta allows us to use a very efficient labelling technique which facilitates simultaneous measurements of the annihilation energy spectrum in the sample and in a standard. The result is that the system becomes essentially free of drift, so that precision of energy determination is limited by the statistics of counting alone.

We have used the efficient technique of Ge(Li) spectroscopy together with labelling to measure the annihilation lineshape. Lineshape parameters, including the first two moments, have been extracted from this data. The techniques are applied to the measurement of recovery at room temperature and to a determination of the binding energy of positrons to traps in aluminum.

MEASUREMENT OF TOTAL SCATTERING CROSS-SECTIONS FOR POSITRONS OF ENERGIES 2-400 eV ON MOLECULAR GASES: H_2 , D_2 , N_2 , CO

P.G. Coleman, T.C. Griffith and G.R. Heyland (United Kingdom)

The results of a time-of-flight experiment are presented, in which the total cross-sections for 2-400 eV positrons on H_2 , D_2 , N_2 , and CO were measured.

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