

THE SOLUBILITY OF KRYPTON IN LIQUID LEAD, TIN AND SILVERJ EXPERIMENTAL TECHNIQUE AND RESULTS

There were three stages in the experimental work: the gas and liquid metal were thoroughly mixed to obtain equilibrium, the gas was diluted and its beta-activity measured, and the metal was rolled into thin foils and its activity measured.

At Harwell a metal sample 4 cm long and ^{85}Kr gas were sealed in an 8 cm length of 6 mm diameter silica tube. To ensure thorough stirring of the gas and liquid metal a silica rod was fixed perpendicular to the tube and rotated at two revolutions a minute by an electric motor. The tube was rotated in a furnace for two days for equilibrium to be reached and then stopped and the tube left vertical for one day for any gas bubbles in the metal to rise to the surface. On removing the tube from the furnace the metal solidified retaining the dissolved krypton.

To measure the high activity of the gas with a Geiger counter it was necessary to take a 10^7 th part. This was done by breaking the silica tube in, a 50 l. glass carboy containing air and 1% inactive krypton, after mixing by convection currents the mixture was passed through a small spiral 1 in. in diameter machined in the face of a brass block and covered with *Scotch Tape*. The spiral section was 0.01 in. wide by 0.01 in. deep with a separation of 0.02 in. between adjacent turns. The gas activity was measured by a 1 in. diameter end-window Geiger-Muller counter placed close to the spiral and a small correction for absorption by the *Scotch Tape* was made using the absorption coefficient given by Gleason *et al.* (1951). Gas activities measured with spirals cut in brass and lead blocks were not appreciably different.

The surface of the sample had a high activity. After the surface had been machined-off transverse discs 3 mm thick were cut from the specimen and rolled into thin foils about 0.005 cm thick, and their activities measured with the Geiger-Muller counter.

To check that the observed activity was due to the dissolved krypton, and not to some impurity, the beta absorption coefficient was measured by placing lead foils of different thicknesses above the specimen; and the absorption coefficient was found to be the same as for ^{85}Kr .