A Positron Annihilation Study of Copper Containing a High Concentration of Krypton

Bulk Cu samples containing up to 4 at.\% Kr have been produced by the Harwell combined ion implantation and sputtering method at temperatures near ambient, and then examined by the positron annihilation technique. Both angular correlation and lifetime measurements were made and, in addition, the specimen substructure was examined by transmission electron microscopy. The main results were a very large increase in angular correlation peak counts and a single measured positron lifetime of approximately 260 ps. The possible defects which might act as positron traps, and give rise to the observed changes, are discussed, with particular emphasis on the very high concentration of small Kr bubbles (approximately 1.5-3 nm in diameter) in the material.

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